**“Healthcare seeking behaviour and its association with Glycaemic control amongst Insulin users in Type 2 Diabetes - A Community based longitudinal study”**

**Thesis submitted to the faculty of**

**ALL INDIA INSTITUTE OF MEDICAL SCIENCES, BHOPAL**

*For the award of the degree of MD in the subject of*

*Community medicine*

by

**Dr. Akhil Jaison**

**(Registration No. 2200429M02P24002)**

Under the Guidance of

**Dr. Ankur Joshi**

**Additional Professor**

Department of Community and Family Medicine

AIIMS, Bhopal

**(October 2024)**

## ALL INDIA INSTITUTE OF MEDICAL SCIENCES, BHOPAL

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**Dr. Akhil Jaison**

Junior resident
Dept. of Community and Family Medicine
AIIMS Bhopal

**Guide**

**Dr Ankur Joshi**

Additional Professor
Dept. of Community and Family Medicine
AIIMS Bhopal

अंकुर जोशी/ANKUR JOSHI
एम. बी. बी. एस, एम.डी./MBBS, MD
अपर प्राध्यापक/Additional Professor
सामुदायिक एवं पारिवारिक चिकित्सा/Community & Family Medicine
अखिल भारतीय आयुर्विज्ञान संस्थान भोपाल-462020
All India Institute of Medical Sciences Bhopal-462020

Place: Bhopal
Date: 14/10/24

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**Guide**

**Dr Ankur Joshi**

Additional Professor
Dept. of Community and Family Medicine
AIIMS Bhopal

अंकुर जोशी / ANKUR JOSHI
एम.बी.बी.एस, एम.डी. / MBBS, MD
अपर प्राध्यापक / Additional Professor
सामुदायिक एवं पारिवारिक चिकित्सा/Community & Family Medicine
अखिल भारतीय आयुर्विज्ञान संस्थान भोपाल-462020
All India Institute of Medical Sciences Bhopal-462020

**Co-guide**

**Prof. (Dr.) Rajnish Joshi**

Professor and Head
Department of Medicine
Medicine
AIIMS Bhopal

Dr. RAJNISH JOSHI MD (Medicine)
Reg.No.16912/MCI MPH, Phd (Epidemiology, USA)
Professor & Head
Department of Medicine
All India Institute of Medical Sciences
Saket Nagar, Bhopal-462020

**Prof. (Dr.) Abhijit P Pakhare**

Professor
Dept. of Community and Family

AIIMS Bhopal

प्रो.(डॉ.) अभिजीत पा पाखरे / Prof. (Dr.) Abhijit P Pakhare
एम.बी.बी.एस, एम.डी. / MBBS, MD
आचार्य / Professor
सामुदायिक एवं पारिवारिक चिकित्सा/Community & Family Medicine
अखिल भारतीय आयुर्विज्ञान संस्थान भोपाल-462020
All India Institute of Medical Sciences Bhopal-462020

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**Dr. Akhil Jaison**

Junior resident
Dept. of Community and Family Medicine
AIIMS Bhopal

Place: Bhopal
Date: 14/10/24

**ALL INDIA INSTITUTE OF MEDICAL SCIENCES, BHOPAL**

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This is to certify that the thesis entitled **"Healthcare seeking behaviour and its association with Glycaemic control amongst Insulin users in Type 2 Diabetes - A Community based longitudinal study"** is the work carried out by **Dr Akhil Jaison** under the supervision and guidance of **Dr Ankur Joshi** in the department of Community and Family Medicine, AIIMS Bhopal.

11.10.2024

**Prof. (Dr.) Arun M Kokane**

Professor and Head
Department of Community and Family Medicine
AIIMS Bhopal

आचार्य एवं विभाग प्रमुख
Professor & Head
सामुदायिक एवं पारिवारिक चिकित्सा विभाग
Department of Community & Family Medicine
अखिल भारतीय आयुर्विज्ञान संस्थान, भोपाल
All India Institute of Medical Sciences, Bhopal
साकेत नगर, भोपाल-462020 (म.प्र.)/Saket Nagar, Bhopal-462020 (M.P.)

Place: Bhopal
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**Dr. Akhil Jaison**
Junior resident
Dept. of Community and Family Medicine
AIIMS Bhopal


**Guide**


**Dr Ankur Joshi**

Additional Professor
Dept. of Community and Family Medicine
AIIMS Bhopal

अंकुर जोशी / ANKUR JOSHI
एम.बी.बी.एस, एम.डी. / MBBS, MD
अतिरिक्त प्राध्यापक / Additional Professor
सामुदायिक एवं पारिवारिक चिकित्सा / Community & Family Medicine
अखिल भारतीय आयुर्विज्ञान संस्थान भोपाल-462020
All India Institute of Medical Sciences Bhopal-462020


**Co-guide**


**Prof. (Dr.) Rajnish Joshi**

Professor and Head
Department of Medicine
Medicine
AIIMS Bhopal

Dr. RAJNISH JOSHI
Regn.No.16912/MCI MD (Medicine)
MPH, Phd (Epidemiology, USA)
Professor & Head
Department of Medicine
All India Institute of Medical Sciences
Saket Nagar, Bhopal-462020

**Prof. (Dr.) Abhijit P Pakhare**

Professor
Dept. of Community and Family

AIIMS Bhopal

प्रो.(डॉ.) अभिजीत पा पाखरे / Prof. (Dr.) Abhijit P Pakhare
एम. बी. बी. एस, एम.डी. / MBBS, MD
आचार्य / Professor
सामुदायिक एवं पारिवारिक चिकित्सा / Community & Family Medicine
अखिल भारतीय आयुर्विज्ञान संस्थान भोपाल-462020
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**Prof. (Dr.) Rajnish Joshi**
Dean (Academics)
AIIMS Bhopal

Place: Bhopal
Date: 14/10/24

# ALL INDIA INSTITUTE OF MEDICAL SCIENCES, BHOPAL

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**Following members attended the meeting:**

1. Prof. D. K. Pal, Former HoD Community Medicine, GMC, Bhopal……Chairperson
2. Prof. Rajnish Joshi, Professor of General Medicine, AIIMS, Bhopal……Member
3. Prof. Amit Agrawal, Professor of Neurosurgery, AIIMS, Bhopal……Member
4. Dr. Sunita Athawale, Professor of Anatomy, AIIMS, Bhopal……Member
5. Dr. Girish Bhatt, Addl. Professor of Paediatrics, AIIMS, Bhopal……Member
6. Dr. Ujjawal Khurana, Assoc. Professor of Pathology, AIIMS, Bhopal……Member
7. Dr. Ankur Joshi, Assoc. Professor of CFM, AIIMS, Bhopal……Member
8. Mr. Trivesh Goswami, Law Officer, AIIMS Bhopal,……Member
9. Dr. Shashank Purwar, Professor of Microbiology, AIIMS, Bhopal……Member Secretary

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**Dr. Shashank Purwar**
**Member Secretary, AIIMS Bhopal IHEC-SR**
**Professor of Microbiology**
**AIIMS, Bhopal**
**Contact Number: 7773010099**

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***ABBREVIATIONS***

| | | |
|---|---|---|
| WHO | : | World Health Organization |
| MODY | : | Maturity onset diabetes of the young |
| IDF | : | International Diabetic Federation |
| NFHS-5 | : | National Family Health Survey-5 |
| NCD | : | Non-Communicable diseases |
| OHA | : | Oral hypoglycaemic agents |
| SGLT-2 | : | Sodium-Glucose Co-transporter 2 |
| DPP-4 | : | Dipeptidyl Peptidase-4 |
| GLP-1 | : | Glucagon like peptide-1 |
| DoPHFW | : | Directorate of Public Health & Family Welfare |
| BMI | : | Body Mass Index |
| CUHA | : | Centre for Urban Health in AIIMS |
| UPHC | : | Urban Primary Health Centre |
| AIIMS | : | All India Institute of Medical Sciences |
| HTN | : | Hypertension |
| BPL | : | Below poverty line |
| LDL | : | Low density lipoproteins |
| SBP | : | Systolic blood pressure |
| SES | : | Socio-economic status |
| AIC | : | Akaike information criterion |
| BIC | : | Bayesian information criterion |

# INTRODUCTION

## ***INTRODUCTION***

Diabetes is a chronic metabolic disorder arising from insufficient insulin production by the pancreas or the body's inability to utilise the insulin produced. The hormone insulin regulates blood glucose. Hyperglycaemia, also called elevated blood glucose or blood sugar, is a frequent consequence of untreated or undertreated diabetes mellitus that can cause significant harm to numerous bodily systems including the heart, blood vessels, kidneys, eyes, nerves, and heart. Type 2 diabetes is the most prevalent kind, usually affecting adults. It is caused by the body either not producing enough insulin or becoming resistant. (1)

Presently diabetes is classified based on aetiology(2),

1. Type 1 diabetes mellitus (beta cell destruction, usually leading to absolute insulin deficiency)
2. Type 2 diabetes mellitus (may range from predominantly insulin resistance with relative insulin deficiency to predominantly secretory defect with insulin resistance)
3. Gestational diabetes mellitus (onset or recognition of glucose intolerance in pregnancy)
4. Other specific types:
    i. Maturity onset diabetes of the young (MODY)
    ii. Genetic defects in insulin action
    iii. Type A insulin resistance, Leprechaunism, Rabson Mendenhall syndrome
    iv. Diseases of endocrine pancreas
    v. Pancreatitis, trauma, pancreatectomy, Cystic fibrosis, Hemochromatosis, Fibrocalculous pancreatopathy
    vi. Endocrinopathies
    vii. Acromegaly, Cushing's syndrome, Pheochromocytoma and Hyperthyroidism
    viii. Drug or chemical induced, e.g. Pentamidine, Nicotinic acid, Glucocorticoids, Diazoxide, beta-adrenergic agonists and Thiazide diuretic

Nowadays, the classification of diabetes is met with increased complexity owing to its intricate pathophysiology, with newer hybrid forms of the disorder. Between type 1 and type 2 diabetes, although the use of insulin and the young age of onset is more common in type 1, type 2 can also present similarly.

### *TYPE 2 DIABETES*

This is the most common form of diabetes seen in adults, with its patients accounting for 90-95% of all cases of diabetes(3). It commonly presents as increased thirst, increased urination, lack of energy, fatigue and weight loss, along with increased frequency of bacterial and fungal infections, pruritis vulvae in women, and delayed wound healing.(4) On the other hand, when excessive plasma glucose is found incidentally during routine screening or during blood investigations carried out in the context of another ailment, asymptomatic persons are diagnosed with diabetes.

Diagnostic criteria(2):

1. Fasting plasma glucose >7.0mmol/l (126mg/dl) after an overnight fast (confirmed by repeat test)
2. Random plasma glucose >200mg/dl and symptoms of diabetes

3. Two-hour plasma glucose >11.1mmol/l (200mg/dl) following 75 grams of glucose or 1.75g/kg for children.
4. HbA1C > 6.5%

***HbA1c***: HbA1c, or glycated haemoglobin, is a blood assay that provides a quantitative picture of the average blood sugar levels during the previous two to three months. It is as crucial for the diagnosis of diabetes as it is for the treatment and observation of the patients with diabetes.

### *EPIDEMIOLOGY OF DIABETES*

The International Diabetes Federation (IDF) reported on November 12, 2021, that 537 million adults worldwide have diabetes. The world's highest population with diabetes is found in India. In addition, the incidence of the illness has been increasing faster in low- and middle-income nations than in high-income nations(3). A National survey done on NCDs by ICMR showed a prevalence of 10.1 crores for diabetes in 2023(5). IDF on December 6, 2021 said that 74 million adults (1 in 12) in India are living with diabetes, making its prevalence the second largest in the world (6).

According to NFHS-5, among the 28 States and 8 Union Territories of India, 17.9% of male urban adult population and 16.3% of female urban adult population are estimated to be people with diabetes on average. In Madhya Pradesh, 11.2% of women and 13.2% of men in urban settings are estimated to be people with diabetes. It is projected that 12.9% of men and 14.3% of women in Bhopal suffer from diabetes. Furthermore, it should be mentioned that 47% of India's out-of-pocket medical expenses are related to NCDs(7).

### *DISEASE PROGRESSION AND TREATMENT GOALS*

Type 2 diabetes is a progressive disease, characterised by increasing hyperglycaemia throughout the disease course(8). This directly implies the inevitability that regimen failure over time is unavoidable and that, when necessary, medication must be increased. While accepting this, it is important to remember that improvements in Type 2 Diabetes patients are thought to depend on a variety of outcomes, including but not limited to:(9)

1. Alleviation of symptoms of diabetes and elevation of quality of life
2. Prevention of acute complications of diabetes
3. Identification and management of comorbid conditions like obesity, hypertension and dyslipidaemia
4. Prevention of chronic complications:
    a. Microvascular: Diabetic retinopathy, neuropathy, nephropathy
    b. Macrovascular complications: Cardiovascular, cerebrovascular and peripheral vascular disease
5. Prevention of infections

The achievement of these outcomes is borne majorly by controlling blood glucose.

***GLYCAEMIC CONTROL:*** Maintaining ideal blood glucose levels, and preventing hyper- or hypoglycaemia are two aspects of maintaining the body's internal milieu in a euglycaemic state, and together form the crux of glycaemic control. HbA1c is the primary metric used

to assess a patient's glycaemic control. Microvascular and other diabetic complications are directly associated with high HbA1c, a sign of inadequate glycaemic management.

### *TREATMENT MODALITIES*

The treatment of diabetes is long-term in nature and employs the following modalities to achieve glycaemic control:

1. Non-pharmacological interventions, namely:
   a. Medical nutrition therapy (MNT)
   b. Weight management
   c. Physical activity
   d. Smoking & alcohol cessation
   e. Diabetes self-management education and support
   f. Psychosocial care
2. Pharmacological agents:
   a. Oral Hypoglycaemic Agents (OHA) – drugs used to manage hyperglycaemia in Type 2 Diabetes, for example: biguanides (metformin), sulphonylureas (glimepiride, glibenclamide, etc.), SGLT-2 inhibitors (dapaglifozin, canaglifozin, etc.), DPP-4 inhibitors (sitagliptin, linagliptin, etc.), thiazolidinediones (rosiglitazone, pioglitazone, etc.), GLP-1 agonists (exenatide, liraglutide), etc.
   b. Insulin therapy(10)

### *INSULIN THERAPY FOR THE MANAGEMENT OF DIABETES*

According to the American Diabetes Association, the most effective glucose-lowering agent is insulin, either for initiation in patients with severe hyperglycaemia or for treatment intensification (11). Insulin analogues are injectable parenteral agents that mimic the physiological secretion of insulin. Type 1 diabetes and uncontrolled, long-term type 2 diabetes are the two main conditions for which insulin analogues are utilised. Insulin comes in various preparations, which may be classified according to their pharmacokinetics(12):

1. Rapid-acting: Insulin Lispro, Insulin Aspart, etc.
2. Short-acting: Regular Insulin
3. Intermediate-acting: NPH Insulin
4. Long-acting: Insulin Glargine, Insulin Detemir, Insulin Degludec
5. Mixtures: NPH/Regular (70:30), etc.

When insulin is used in type 2 diabetes, a long-acting formulation is usually added initially while continuing oral medications(2).

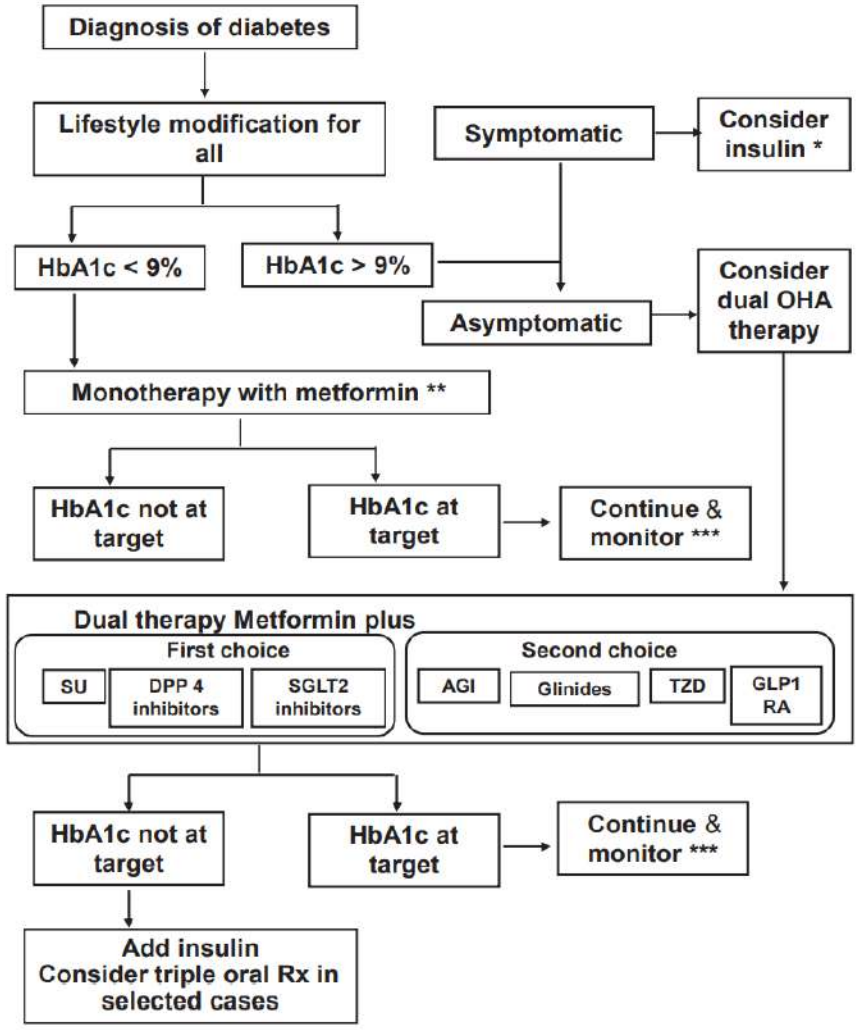



***Figure 1: Suggested algorithm for the use of anti-hyper glycaemic agents (ICMR)***

### *TREATMENT ADHERENCE*

Due to the chronic, progressive nature of the disease, there is a need for lifelong treatment that involves monitoring and revision, and the emergence of new issues necessitate constant, long-term preventative measures. Adhering to these aims of treatment requires regular follow-ups(13). Only optimal medication adherence allows for good health outcomes, and non-adherence is associated with a number of detrimental health effects, including inadequate glycaemic management(14), increase healthcare expenses(15) and premature mortality. The issue of non-adherence is impacted by the population being studied and the various risk variables that are involved, such as low socioeconomic status(16), limited healthcare access, low health literacy(17), social stigma, fear of administering insulin in front of others, pain from injections, worry about hypoglycaemia, the rigidity and demands of the regimen(18) or even old age. Studies show that people using insulin had adherence rates as low as 41.5%. (11). In addition, patients on insulin report higher levels of emotional anguish compared to those on oral drugs, and this emotional distress is associated with both non-adherence and insufficient glycaemic control(19).

### *HEALTH SEEKING PATTERN*

Health-seeking behaviour is influenced by various domains in the individual, family and community level.(20) Individuals with diabetes have a daily challenge since they have to modify their lifestyle to delay or prevent complications. These changes include increasing physical activity, quitting smoking, altering their dietary habits and taking their medications as prescribed. Managing diabetes may include collaborating with a range of medical specialists, including dieticians and family/general practitioners, depending on the severity of the condition(21). The very idea of introducing such complex changes to their lives itself can be a enormous task. It is even more challenging to pursue health and continue with these activities that promote health because of the long-term nature of these safeguards and procedures. Individuals with diabetes often delay or ignore medical attention until problems begin to manifest(22). As aforementioned, people who take insulin find it more difficult to follow the recommended schedule and face a number of other obstacles that keep them from receiving insulin therapy. Therefore, for insulin users, health-seeking behaviours become even more significant. Diabetes patients' complex patterns of health-seeking have not received enough attention in the literature. It is vital to comprehend these dynamics in order to create efficacious communication and health management tactics(23).

Apart from the impact on an individual's well-being, the ailment and its related ramifications carry noteworthy fiscal consequences by way of medical expenses and reduced work output. For patients with insulin-dependent diabetes to live, easily accessible, reasonably priced insulin therapy is necessary. On top of the expenses, a lot of the patients, especially in rural areas, do not have the capability to store the insulin properly, which in turn leads to the reduced adherence and/or ineffectiveness of the injections. Good health-seeking practices can help control diabetes and reduce the risk of complications. These behaviours include early symptom recognition, presentation to medical facilities, and adherence to successful treatment(20).

The Government of Madhya Pradesh in 2012 started *"Sardar Vallabhai Patel Nishulk Aushadhi Vitran Yojana"*. Under this scheme, free medicines for Diabetes are distributed to patients attending the government facility. Although medication is made available free

of cost, the facility's linkage to the health system seems to be another determining factor in the successful implementation of the scheme. Thus, against the backdrop of antidiabetic medication being made available to users' end by the government, it seems prudent to think about what factors facilitate linkage and what factors obstruct the process.

Understanding the multi-dimensional factors that may influence the clinical and psychological well-being of people with diabetes, with a focus on what influences people to take up more healthy behaviours, seems to be of great importance in complicated diseases like diabetes. In India, there have been only a handful of studies exploring health-seeking patterns of insulin users in type 2 diabetes. In this study, a novel approach is used to get a holistic understanding of factors that may affect one's health-seeking behaviour based on the Andersen model, and to explore its association with glycaemic control over time.

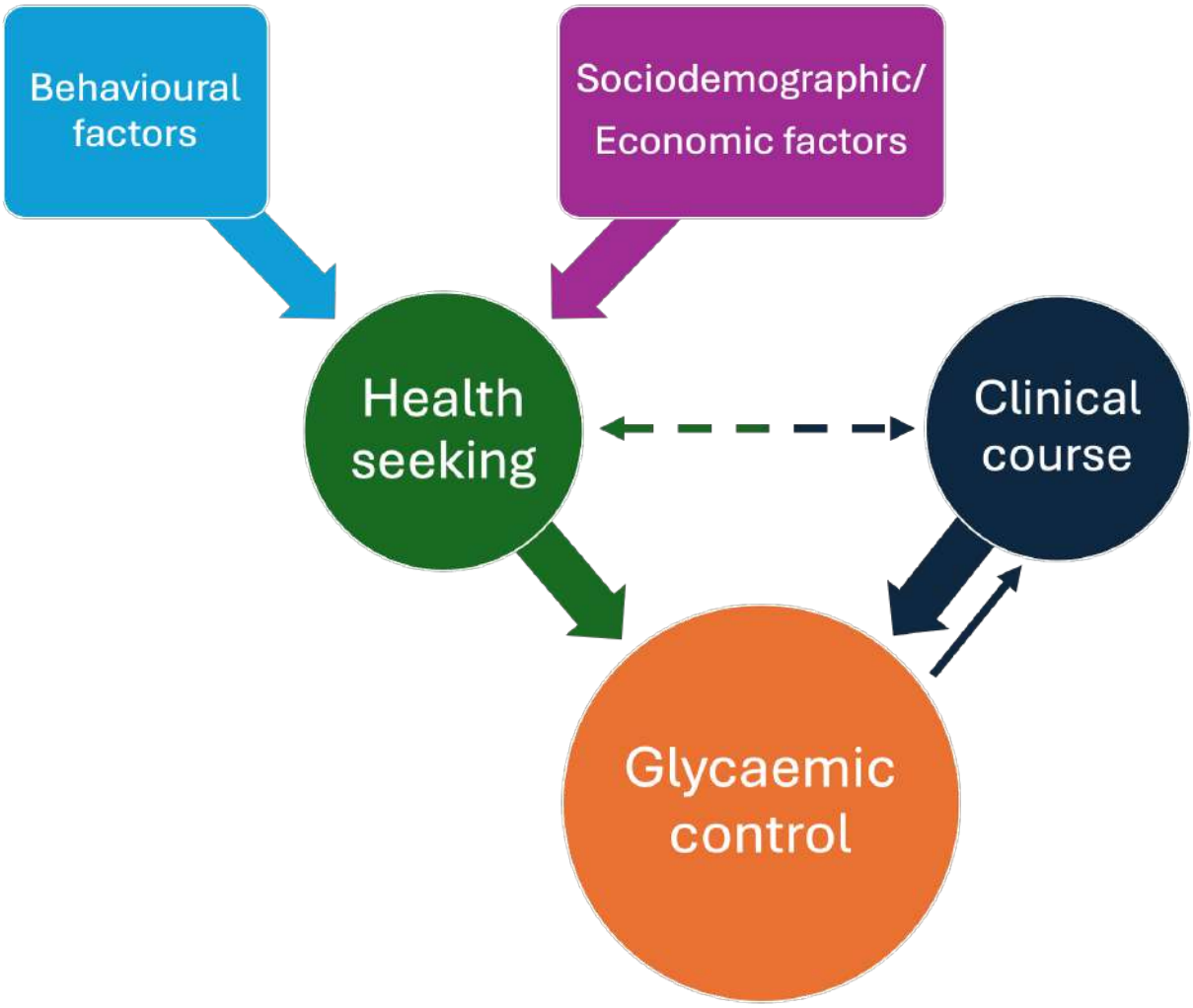



***Figure 2: Interplay of various factors in affecting glycaemic control, health-seeking pattern and clinical course of diabetes***

## *RATIONALE*

Hyperglycemia, a chronic condition caused by decreased insulin production or insulin resistance, is the hallmark of type 2 diabetes mellitus (T2DM). A multimodal strategy that incorporates OHA/insulin therapy and lifestyle adjustments is necessary for the effective management of type 2 diabetes. Adherence to these measures can be difficult, though, resulting in less than ideal glycaemic control and related problems. Understanding the variables that affect treatment adherence, use, and positive health behaviors in people with type 2 diabetes is essential to resolving this problem.

### Theoretical Framework: Andersen's Behavioral Model

A strong theoretical foundation for comprehending the variables influencing health-related behaviors is offered by Andersen's behavioral model. According to this paradigm, a complex interplay of need, enabling, and predisposing factors determines health behaviors. We can learn much about the variables that affect insulin use and self-maintenance needed in diabetes by using this model in the context of type 2 diabetes.

### Predisposing Factors

Predisposing factors are individual characteristics that are intrinsic to a person. In the context of T2DM, these factors may include:

- **Sociodemographic characteristics:** Age, gender, education level, socioeconomic status, and cultural background.
- **Health beliefs:** Beliefs about the causes, consequences, and severity of T2DM, as well as the perceived benefits and risks of insulin use and lifestyle modifications.

### Enabling Factors

Enabling factors are extrinsic factors and opportunities that facilitate or hinder health behaviors. These may include:

- **Social support:** The availability of emotional and practical support from family, friends, and healthcare providers.
- **Economic resources:** The ability to afford insulin, other necessary supplies, and healthy foods.
- **Access to healthcare:** The availability of healthcare providers, facilities, and services.
- **Environmental factors:** The built environment, such as access to safe spaces for physical activity and healthy food options.

### Need Factors

Need factors are the perceived benefits/barriers and cues to action associated with health behavior. In the context of T2DM, these may include:

- **Perceived benefits/barriers:** Beliefs or preconceptions about the benefits of insulin use and positive health behaviors, such as improved glycemic control, reduced risk of complications, and enhanced quality of life.

- **Cues to action:** Factors that can urge a person do positive health behaviors.

Based on Andersen's behavioral model, this study tried to:

- Understand the predisposing, enabling, and need factors that influence insulin use and positive health behaviors in individuals with T2DM.
- Examine the relationships between these factors and glycemic control.
- Explore how these factors interact to influence health behaviors.

Despite its significance, little data is available on diabetes and its treatment adherence patterns from central India. Being a self-injectable long-term therapeutic modality, insulin presents many challenges for its proper use and may affect the person’s health-seeking patterns. To default is only human, and for a complex disease like diabetes, it is all the more necessary to understand how to make it easier for a patient. The results of this study can further our knowledge of the variables influencing insulin use and healthy lifestyle choices in people with type 2 diabetes. This understanding can inform the development of targeted therapies that can increase adherence to treatment plans and optimize glycemic control, ultimately leading to better health outcomes for persons with type 2 diabetes mellitus.

# REVIEW OF LITERATURE

## ***REVIEW OF LITERATURE***

### *FACTORS AFFECTING DIABETES*

Diabetes is a multisystemic disease whose genesis and development are influenced by various facets of an individual's life, including their birth conditions, upbringing, and choices made in life. Anthropometric factors like BMI, waist circumference, and blood pressure; lifestyle factors like diet choice (high fat or high sugar), lack of physical activity, use of alcohol or tobacco, and other socio-epidemiological factors where the person lives all play significant roles. Clinical factors like family history of diabetes, duration of diabetes in years, number of medications used for diabetes, and comorbidities also contribute to the same.

***Coningsby (2022)***

14 persons with type 2 diabetes who had turned down an invitation to attend diabetes self-management education in Bath and North East Somerset, UK, participated in a cross-sectional semi-structured qualitative interview study. Two primary topics emerged from the study: "practical barriers" and "perceived need"(24). Due to their high levels of self-efficacy, poor regard for their situation, and lack of program understanding, participants frequently declined education. Transportation problems and other obligations were examples of practical obstacles.

***Feldman BS et al.***

They used an objective measure of medication adherence to evaluate the attributable effect of oral glucose medication adherence as a risk factor for inadequate glycaemic control. They demonstrated that increasing disease duration increased good adherence rates yet reduced glycaemic control. Adherence and poor control exhibited a strong inverse interrelationship. According to their observations, a significant fraction of the diabetic population has poor adherence to oral antidiabetic treatments, which is closely linked to subpar glycaemic control in all ranges of duration of illness. Adherence emerged as having a substantial mediating effect between age and poor glycemic control. They concluded that efforts to increase adherence should be concentrated on the younger subgroup of people with diabetes as it shows a greater positive effect on their glycaemic control than older patients.

***Lee (2021)***

They employed information from the Demographic and Health Surveys (DHS) conducted in South Africa (2016) and Namibia (2013) to investigate the risk factors for undiagnosed diabetes in persons between the ages of 35 and 64. In Namibia, living in a rural area (aOR=2.21) and being under 45 (aOR=3.20) were linked to increased chances of undiagnosed diabetes. The odds were higher (aOR=2.33) for the poorest-to-poorer group in South Africa than for the richer-to-richest group(25). In both nations, high blood pressure was linked to a decreased risk of undiagnosed diabetes (aOR=0.31 in Namibia and aOR=0.21 in South Africa).

***Candice M. Morello P et al.***

They showed that diabetes care is significantly hampered by medication nonadherence, which adversely impacts patients. They concluded that understanding the causes of nonadherence may aid in developing patient, provider, and system-focused interventions that assist in boosting medication adherence rates, lessen consequences from uncontrolled diabetes, and reduce overall management costs. They also said that innovative technology, combined with advancements in treatment and delivery methods, can assist patients in overcoming some of the difficulties in managing their diabetes.

***Gouveia (2020)***

Methodology: The Theory of Planned Behaviour (TPB) was the foundation for this descriptive, cross-sectional, quantitative-qualitative study. Thirty-two insulin-using participants participated in the study; data were gathered through one-on-one interviews, with responses classified into belief categories for analysis.

Findings: 118 behavioral beliefs, 60 normative beliefs, and 97 control beliefs were found in the study. Keeping diabetes under control was considered a major benefit among the behavioral attitudes. However, the discomfort associated with applying insulin was considered a major drawback(26). According to conventional wisdom, kids were the biggest advocates of insulin use. Both the simplicity and complexity of applying insulin were emphasized by control beliefs as important variables.

***Levy (2022)***

Social Determinants of Health (SDOH) questionnaires and the Diabetes Distress Scale were used in a cross-sectional, mixed methods study with 57 participants in an urban safety-net clinic. The findings showed that 92% had obstacles in one or more SDOH domains. The fields of health and healthcare (84%) and economic stability (54%), however, faced the greatest obstacles. 79% of respondents reported at least moderate diabetes-related distress, with a mean DDS score of 2.09.

***Chandra Y Osbourne et al.***

They observed how studies looking at the effect of stressors on diabetic self-care have tended to be qualitative or to concentrate on a specific stressor. They investigated whether having quantitatively greater stressors was linked to lower adherence to a variety of self-care practices in a high-risk cohort of people with type 2 diabetes. They showed that among participants trying to follow recommendations, experiencing more stressors was linked to lower adherence to dietary advice and medication use, but not to other self-care practices. Adults who are adhering may encounter obstacles to adherence brought on by an accumulation of stressors that are separate from the accompanying depressive symptoms.

***Baek RN et al.***

They said that to better understand the relationship between the burden of diabetes, represented by the need for insulin and the presence of diabetic complications, and diabetic distress, their study looked at the moderating effect of social support. After adjusting for diabetes burden, a significant relationship between lower distress and higher support satisfaction was found. The link between the burden of diabetes and diabetic distress was considerably mitigated by support satisfaction and several supports. They

said insulin was substantially connected with increased diabetes distress at low levels of support but not at high levels of support, according to post hoc probing results. They said that the stress-buffering theory is supported by the data, which also hints that social support may be protective against diabetes distress.

***Gonzalez JS et al.***

They tried to understand the potential mediation role of self-efficacy and perceived control over the condition in the independent pathways relating to emotional distress, medication adherence, and glycaemic control in people with Type 2 diabetes. They used HbA1c to assess glycemic control. They found that for both medication adherence and HbA1c results, perceived control was a key mediating factor for emotional distress. They observed a positive correlation between self-efficacy and perceived control with medication adherence and HbA1c. A substantial indirect influence on diabetes distress and medication adherence through perceived control and self-efficacy was shown with mediation analyses. A perceived control-related indirect impact was found to be responsible for the association between distress and HbA1c. Results showed that among individuals with Type 2 diabetes, emotional distress related to diabetes is associated with worse treatment compliance and glycaemic control; he concluded that these connections were largely mediated by perceived control over diabetes.

***JE Aikens et al.***

They tried to ascertain longitudinally whether self-reported medication adherence predicts future glycaemic control in Type 2 diabetes. Among their findings, just half of the study participants indicated high adherence. They established a correlation between adherence and HbA1c by cross-sectional adjusted analysis. After accounting for baseline HbA1c, they found that each point higher in the baseline Morisky total score was linked to an increase in HbA1c of 1.8 mmol/mol (or 0.16%), assessed six months later. They concluded that self-reported adherence to diabetes medication accurately predicts long-term glycaemic control, even after strict correction for baseline glycaemic control.

***Hamersky (2019)***

34 papers on adherence, persistence, and health outcomes in individuals with type 2 diabetes who use injectable antihyperglycemics were examined in this systematic review. It was found that glycaemic management was generally better when injectable antihyperglycemics were taken as prescribed(27). Nevertheless, no research found a minimally significant difference (MCID). Patients who were adherent spent less on medical care but more on medications related to their diabetes.

***He (2024)***

They tried to ascertain the factors impacting long-term insulin adherence and assess whether targeted interventions would improve adherence. After self-developed measures and questionnaires were used on a cohort of 180 patients in Nanjing, China to ascertain baseline characteristics, a control group and an intervention group were created from the participants, the intervention group receiving regular telephone sessions and educational interventions targeting subjects' knowledge, attitude and practices (KAP), while the control group received treatment as usual. They found that age, the length of diabetes, health insurance status, HbA1c level, knowledge, self-efficacy, and beliefs were among

the factors affecting adherence(28). The intervention group displayed better knowledge, beliefs, self-efficacy, adherence, and HbA1c levels after the targeted interventions.

***CONTEXT ON INSULIN THERAPY***

Insulin is used to treat diabetes mellitus; its form varies according to the kind of insulin delivery system used and how long it takes to take effect. Aside from pharmacological issues, the injection technique is crucial since insulin can only be administered parenterally. It should go without saying that using proper injection techniques improves glycemic control, but people with diabetes and those who support them hardly acknowledge this. Prefilled pens and ampules that need to be loaded with insulin before use are the most popular types of insulin delivery devices. Technical aspects like the injection site and insulin administration method are important among the various components of insulin administration.

Insulin can be injected subcutaneously into the upper arm, buttocks, anterior and lateral sides of the thigh, and belly (preferred site). Incorrect handling of the insulin delivery device, incorrect injection technique, or incorrect site selection alters the properties of insulin absorption, resulting in hypoglycemia, glycaemic fluctuation, and unfavorable long-term effects. Site rotation is another element that keeps the tissues healthy. Lipo-hypertrophy, or a thickened lesion in the subcutaneous tissue due to repeated injections at the same place, affects about 50% of insulin users. Lipo-hypertrophy is still a common adverse effect of insulin treatment, despite its decreased incidence. Patients may choose the lipo-hypertrophic region to reduce discomfort because it gradually loses its pain sensitivity. Injecting the lipo-hypertrophic region repeatedly impairs insulin's ability to enter the bloodstream and regulate blood sugar levels. It's important to remember not to exercise, take warm baths, or go outside in the cold right after getting an insulin injection. Insulin can be left outside for up to ten minutes, although it should be stored between two and eight degrees Celsius.

***Gillani (2019)***

Using a combination of subjective and objective evaluations including multiple questionnaires and drug profiles, data from 430 Type 2 Diabetes patients in Malaysia were gathered for this cross-sectional observational study. It was found that compared to OAM users (35.8%), insulin users had a greater percentage of healthy BMI (44.7%) and a better-controlled glycaemic index ($P = 0.001$). In the domains of regular work ($P < 0.047$), pain and discomfort ($P < 0.041$), and anxiety and depression ($P < 0.001$), significant differences were discovered(29). Insulin users had a mean adherence score of 6.09, higher than that of OAM users (4.19).

***Pechnikova (2021)***

71 teenagers with type 1 diabetes mellitus and their mothers were administered the "Degree of compliance" and MMAS scales, and compliance was evaluated. The ADOR and Family Anxiety Analysis questionnaires were used to assess paternal attitudes. The

Concerns of the Illness Progression Model questionnaire was used to gauge people's attitudes towards illness. It was found that Family anxiety (beta=-.406, p<.001), length of sickness (beta=-.218, p<.05), and number of consultations (beta=.0212, p<.05) all predicted compliance. Concerns about the disease (beta=.876, p<.001), distraction coping (beta=.501, p=0.001), negative thinking (beta=-.421, p<0.02), and frequency of appointments (beta=.274, p<.05) were better predictors of compliance for teenagers aged 15 to 17(30).

***Kumar (2021)***

An interview-based cross-sectional observational study involving 120 Type 2 Diabetes patients in Madhepura, India. It was found that 62.5% of subjects were worried about pricking, 91.7% feared lipohypertrophy, 61.7% feared hypoglycemia, 91.7% thought travel would interfere with insulin administration, and 56.7% had misconceptions regarding the drug(31).

***Hailu (2024)***

Structured questionnaires were used in a cross-sectional study with 271 Type 2 Diabetes patients in Addis Ababa, Ethiopia. It was found that 37.6% had negative attitudes and 85.6% had inadequate knowledge about insulin therapy. Age, occupation, and length of OAD use were factors linked to knowledge. Age, marital status, employment, length of OAD use, and family history of insulin use were factors linked to attitude(32).

***Weiner (2019)***

Electronic health data were used in a longitudinal cohort research with 21,531 participants between the ages of 75 and 79. The findings were:18.9% of people over 75 used insulin. Compared to good health (10.5%), insulin use was higher in poor health (29.4%) and intermediate health (27.5%). Within a 4-year period, 32.7% of patients stopped taking insulin; healthier people ceased more frequently(33).

***Janneth Bermeo-Cabrera et al.***

They tried to look at the variables that affect insulin adherence in people with type 2 diabetes who visit a tertiary care facility in Mexico City. They found that patients of type 2 diabetes receiving referral care at a tertiary care facility had insufficient adherence to insulin therapy. Low socioeconomic status, anxiety regarding hypoglycaemia, and higher number of insulin applications per day were the main risk factors for insulin omission.

***Peyrot M et al.***

They tried to assess patients' adherence to their insulin regimens and the views of patients and medical practitioners on insulin therapy. They reported an insulin omission or non-adherence by 33.2% of patients at least once in the previous month, on average for 3.3 days. A mean of 4.3 days per month of basal insulin omission/non-adherence and 5.7 days

per month of prandial insulin omission/non-adherence are reported by medical practitioners as normal patient non-adherence to insulin therapy. They concluded that the top five reasons given by both patients and healthcare professionals for not taking insulin are being too busy, traveling, skipping meals, stress, and public shame. Physicians reported that patients had a poor success rate with prompt insulin initiation and insulin dose adjustments. Numerous patients receiving insulin do not have proper glucose control, according to 87.6% of medical practitioners, and 75.5% of practitioners reported that they would treat patients more aggressively if they were not worried about hypoglycemia. They found that even though most patients view insulin therapy as limiting, more patients believe that it has beneficial than negative effects on their lives. They said that patients receiving insulin experience suboptimal glucose control, partly due to insulin non-adherence and a lack of dose modification, and said that less restrictive, demanding insulin regimes with a lower risk of hypoglycemia are required.

***S. (2024)***

The goal of this work was to predict patients' insulin-dependent type 2 diabetes using a machine-learning model. It sought to enhance diabetes care by evaluating the impact of insulin on glycemic control.

***Saltar (2024)***

This evaluation of the literature focused on removing systemic, psychological, and physical barriers to insulin start and treatment for individuals with type 2 diabetes.

***Wu (2021)***

Between 2010 and 2017, electronic medical records of 7009 persons with type 2 diabetes who were administered insulin were examined as part of a retrospective cohort research. Using natural language processing, the reasons for stopping insulin administration were found. Findings: Within a year, 42.2% of patients stopped taking insulin. The most frequent causes were beginning non-insulin diabetic medicine (16.7%), achieving weight loss (18.5%), and improving blood glucose control (33.2%). Insulin discontinuation was more common in patients on a basal-bolus regimen or under the care of an endocrinologist.

***Alslail (2021)***

The RIMODIS trial was a cross-sectional, national, multicenter, non-interventional disease registry that included 3010 Saudi Arabian patients with type 2 diabetes. The results showed that pre-mixed insulin was used to treat more than 60% of patients, and OADs were also prescribed to most of them. Individuals using only insulin showed improved HbA1c management. Insulin with OADs lowered hypoglycemia and somewhat improved treatment satisfaction ratings(34). However, only two-thirds of the patients reached the desired glycaemic levels.

***Singh (2022)***

Validated questionnaires were used in a cross-sectional observational study involving 100 individuals with type 2 diabetes in Chennai, India. Findings: 84% of insulin injections were subcutaneous. Being very busy (62.79% of men) and being inconvenient (62.79%

of women) were non-adherence reasons. Older age groups and those with longer disease duration had higher adherence rates(35).

***Alomran (2020)***

This cross-sectional survey involved 366 T2DM patients attending primary hospitals in Saudi Arabia's Al-Ahsa. A pair of validated structured questionnaires were employed to gather data. The researchers found that psychological insulin resistance (PIR) was present in one-third of the individuals. Insulin use willingness was correlated with age (P = 0.013) and length of diabetes (P = 0.0001). Hearing about negative experiences with insulin (59.34%) and fear of reliance (54.20%) had an impact on negative sentiments(36). The willingness to use insulin was dramatically increased (P = 0.0001) by a positive doctor-patient connection.

## *BARRIERS ASSOCIATED WITH LINKAGE TO HEALTHCARE*

The majority of people have a limited understanding of diabetes mellitus, and this lack of awareness prevents them from getting help. Until individuals experience incapacitating symptoms, they are unlikely to visit a hospital. Another major obstacle is the lack of medication availability at a medical facility, which forces patients to buy their prescription drugs from outside sources, increasing the expense of their care. This gives rise to another important set of obstacles: the financial ones. These include, among other things, the absence of health insurance, poor income, high medical costs, the lack of availability of free medications, and the lack of closeness of medical facilities. Another reported barrier that significantly affects glycaemic control is the duration of the patient-doctor consultation. High patient loads often impede effective patient-doctor communication, which is crucial for treating the long-term lifestyle requirements of diabetes. The most common barriers to acceptability include the inability to take the prescription regularly, dietary changes, and concern over possible side effects.

## *SARDAR VALLABHAI PATEL NISHULK AUSHADHI VITRAN YOJANA*

Up until the beginning of 2012, the drug availability count in state healthcare facilities presented a very bleak picture. The Sardar Vallabh Bhai Patel Nishulk Aushadhi Vitaran Yojana (Free Drug for All plan) was introduced in November 2012 in response to the pressing need to increase the availability and accessibility of medications in public healthcare facilities. The primary goal of the program was to ensure that every patient in the 10,640 public health facilities around the state could get the bare minimum of prescription drugs without having to pay for them. DoPHFW used an evidence-based approach to raise access to healthcare and reduce out-of-pocket costs. Hiring experts improved the procurement cell, revised the standard bidding documents, and updated the Essential Drug List. The system used for supply chain management is the state's drug management information system. According to the Minimum Drug List, 147 medications

must be accessible at the District Hospital level, 132 at the Civil Hospital level, 107 at the CHC level, 71 at the PHC level, and 24 at the SHC level all day, every day(37).

### *HEALTHCARE SEEKING BEHAVIOR*

Numerous studies and technical developments have led to significant changes in the healthcare delivery system, but this does not guarantee everyone can access healthcare services equally. Various circumstances, including wealth, age, and gender influence a person's ability to access these services. As a result, the behavior of seeking medical attention becomes crucial. Healthcare utilization models provide guidance on how to define variables, describe how they relate to one another, and evaluate policies and programs that deal with accessing and using healthcare services. In general, there are four categories: behavioral, psychological, social, and economic.

#### *Hone (2022)*

They examined healthcare utilization among 1007 participants in India who were at high risk of acquiring type 2 diabetes using baseline data from the Kerala Diabetes Prevention Program. According to the survey, 12.9% of patients sought inpatient care and 27.9% used outpatient care. The likelihood of men using outpatient treatments was lower (OR=0.56). The use of outpatient services was linked to poor overall health status (OR=5.71), low social support (OR=1.69), and sick leave (OR=8.01). Utilisation of inpatient services was linked to poor general health state (OR=3.59), higher educational status (OR=0.63), and sick leave (OR= 1.21)(38).

#### *Shin (2017)*

They did an analysis based on 40,803 adult participants' data from the 2011–2012 California Health Interview Survey (CHIS). To investigate the relationships between different variables and help-seeking behaviors for significant psychological distress in people with diabetes, logistic regression was utilized. According to the study, individuals with diabetes had a higher probability of experiencing psychological distress compared to those without diabetes (OR 1.46, 95% CI=1.11–1.91, p=0.006). Furthermore, compared to individuals with only psychological distress, those with combined diabetes and psychological distress were less likely to recognize the need for mental health services and seek assistance(39).

***BEHAVIORAL MODELS TO UNDERSTAND DIABETES***

Various models and theories of health behavior and behavior change have been described. The evolution, strengths, and weaknesses of these models help us understand how they can be used to predict positive health behaviors.

**Health Belief Model (HBM)**

The Health Belief Model (HBM) emerged in the 1950s as an expectancy-value model. It posits that health behaviour is influenced by perceived threat (a combination of perceived susceptibility and severity of a disease) and decisional balance (weighing perceived benefits against perceived barriers). The model acknowledges the influence of psychosocial variables and environmental cues but views these as acting through perceived threat or decisional balance. HBM has been critiqued for its limited scope, particularly in explaining habitual behaviors like smoking (40).

**Social Cognitive Theory (SCT)**

Developed by Bandura, Social Cognitive Theory (SCT) emphasizes personal agency and the importance of context in health behaviour. The core construct is self-efficacy, or one's perceived ability to perform a specific action in a particular context. SCT also considers outcome expectations and barriers/facilitators arising from social and cultural forces. The theory has been influential in both understanding and intervening in health behaviours, offering clear targets for improving efficacy beliefs and supporting self-regulation.

**Relapse Prevention (RP) Model**

The Relapse Prevention (RP) model focuses on behaviour change, particularly in the context of addictive behaviours. It identifies immediate determinants (e.g., high-risk situations, coping mechanisms, outcome expectancies, and the abstinence violation effect) and covert antecedents (e.g., lifestyle factors and stress) as key factors influencing relapse. The model highlights the role of both tonic (trait-like) and phasic (dynamic) influences on relapse, emphasizing the importance of early intervention and coping strategies.

**Self-Determination Theory (SDT)**

Self-Determination Theory (SDT) by Deci and Ryan posits that humans are driven by three core needs: competence, relatedness, and autonomy. The theory distinguishes between intrinsic motivation (driven by interest, enjoyment, or satisfaction) and extrinsic motivation (driven by external factors). SDT emphasizes the importance of aligning goals with core needs and leveraging intrinsic incentives for sustained behaviour change. It also highlights the role of social connections in motivating behaviour.

**Socio-Ecological Model**

The socio-ecological model assumes that health behaviour is influenced by multiple factors, including individual, community, state, and national levels. It emphasizes the

importance of considering the built and social environments in which individuals operate. Effective health behaviour change requires flexible and adaptable interventions that account for these various levels of influence.

**Biological Model of Desire**

This model describes how substances and behaviours become habitual through activity in the brain's reward network, involving regions like the ventral tegmental area, striatum, amygdala, hippocampus, and prefrontal cortex. Initially, both conscious and nonconscious processes are involved, but with repeated exposure, the behaviour becomes a habit driven by nonconscious processing. This model underscores the importance of integrating neuroscience concepts into health behaviour interventions.

***SUMMARY TABLE – BEHAVIOURAL MODELS***

| **Theory** | **Description** | **Advantages** | **Disadvantages** | **Insulin scenarios** |
|---|---|---|---|---|
| **Health Belief Model (HBM)** | Focuses on individuals' perceptions of the threat posed by diabetes and the benefits of taking Insulin. | - Simple to understand and apply<br>- Focuses on individual perceptions | - May not account for habitual behaviours<br>- Assumes rational decision-making | Encouraging patients to take Insulin supplements by addressing the perceived severity of diabetes and the benefits of treatment adherence |
| **Theory of Planned Behavior (TPB)** | Predicts deliberate behaviour, because behaviour can be planned. | - Considers intention, which can lead to behaviour change<br>- Includes perceived control | - Does not account for spontaneous behaviours<br>- Relies on self-reporting | Reducing diabetes by addressing attitudes toward Insulin adherence, subjective norms (peer influence), and perceived control (ease of access) |
| **Social Cognitive Theory (SCT)** | Emphasizes the role of observational learning, social experience, and reciprocal determinism. | - Accounts for environmental and social influences<br>- Emphasizes self-efficacy | - Can be complex to implement<br>- Requires a thorough understanding of social dynamics | Promoting Insulin adherence by modeling and reinforcing positive behaviours within community groups |

| | | | | |
|---|---|---|---|---|
| **Transtheoretical Model (TTM)** | Describes the stages of change individuals go through in modifying behaviour. | - Identifies stages of change<br>- Tailors interventions to specific stages | - Can be time-consuming to assess stages<br>- Assumes linear progression | Supporting people with diabetes by providing stage-appropriate interventions (e.g., readiness to start Insulin) |
| **Diffusion of Innovations** | Explains how, why, and at what rate new ideas and technology spread through cultures. | - Useful for large-scale adoption<br>- Considers social systems and innovation attributes | - Not focused on individual behaviour<br>- May not address specific behaviour change | Promoting Insulin adherence in a community through influential community leaders and early adopters |
| **Self-Determination Theory (SDT)** | Focuses on the degree to which an individual's behaviour is self-motivated and self-determined. | - Emphasizes intrinsic motivation<br>- Promotes autonomy, competence, and relatedness | - May not address external influences effectively<br>- Requires a supportive environment | Enhancing adherence to Insulin by fostering intrinsic motivation and understanding the personal health benefits |
| **Protection Motivation Theory (PMT)** | Describes how people are motivated to react in a protective way to avoid negative health outcomes. | - Focuses on threat appraisal and coping appraisal<br>- Provides a clear framework for designing interventions | - May induce fear or anxiety<br>- Assumes rational decision-making | Encouraging Insulin use by highlighting the health risks of diabetes and the benefits of taking Insulin to control it |
| **Ecological Model** | Considers multiple levels of influence on behaviour, including individual, interpersonal, organizational, community, and public policy. | - Holistic approach<br>- Considers multiple influencing factors | - Complex to implement<br>- Requires multi-level intervention | Addressing diabetes through individual counseling, community education, and supportive health policies for the availability of Insulin. |

| | | | | |
|---|---|---|---|---|
| **COM-B Model** | Identifies three components (Capability, Opportunity, Motivation) necessary for behaviour change. | - Comprehensive and integrative<br>- Easy to understand and apply | - Can be broad and require detailed assessment<br>- Needs thorough context analysis | Improving Insulin adherence by addressing capability (knowledge and skills), opportunity (availability and accessibility), and motivation (belief in benefits) factors |
| **Integrated Behavioural Model (IBM)** | Combines multiple theories to predict health behaviours, including TPB, SCT, and others. | - Broad and integrative<br>- Considers multiple determinants of behaviour | - Can be complex to apply<br>- Requires extensive data collection and analysis | Enhancing adherence to Insulin by integrating attitudes, social norms, and perceived control factors from multiple theoretical perspectives |

***ANDERSEN AND NEWMAN'S FRAMEWORK OF HEALTH SERVICE UTILIZATION***

The Andersen model is a behavioural model that illustrates the variables influencing healthcare usage. According to this paradigm, three dynamics—need, enabling, and predisposing factors—determine the use of health services. For a comprehensive understanding, all three aspects are examined from both an individual and contextual standpoint. The approach incorporates feedback loops and connects the utilization of services to the final result of health outcomes.

1. *Predisposing Factors:* These relate to the sociocultural traits that people possess before they become ill. These include Health Beliefs (People's Attitudes, Values, and Knowledge About and Towards the Health Care System), Social Structure (Education, Occupation, Ethnicity, Social Networks, Social Interactions, and Culture), and demographics (Age and Gender).
2. *Enabling Factors:* These pertain to the practical issues of getting medical attention. Personal/Family (the ability to obtain health services, money, health insurance, a consistent source of care, travel, and the number and caliber of social contacts) and Community (the availability of medical staff and facilities, as well as waiting times) are a few examples.
3. *Need Factors:* The functional and physiological issues that lead to the requirement for health care services are the primary reason for utilizing health services.

“Perceived need will better help to understand care-seeking and adherence to a medical regimen, while evaluated need will be more closely related to the kind and amount of

treatment that will be provided after a patient has presented to a medical care provider." (Andersen, 1995)

Perceived need is explained as "How people view their general health and functional state, as well as how they experience symptoms of illness, pain, and worries about their health and whether or not they judge their problems to be of sufficient importance and magnitude to seek professional help." (Andersen, 1995)

Evaluated need "Represents professional judgment about people's health status and their need for medical care." (Andersen, 1995)

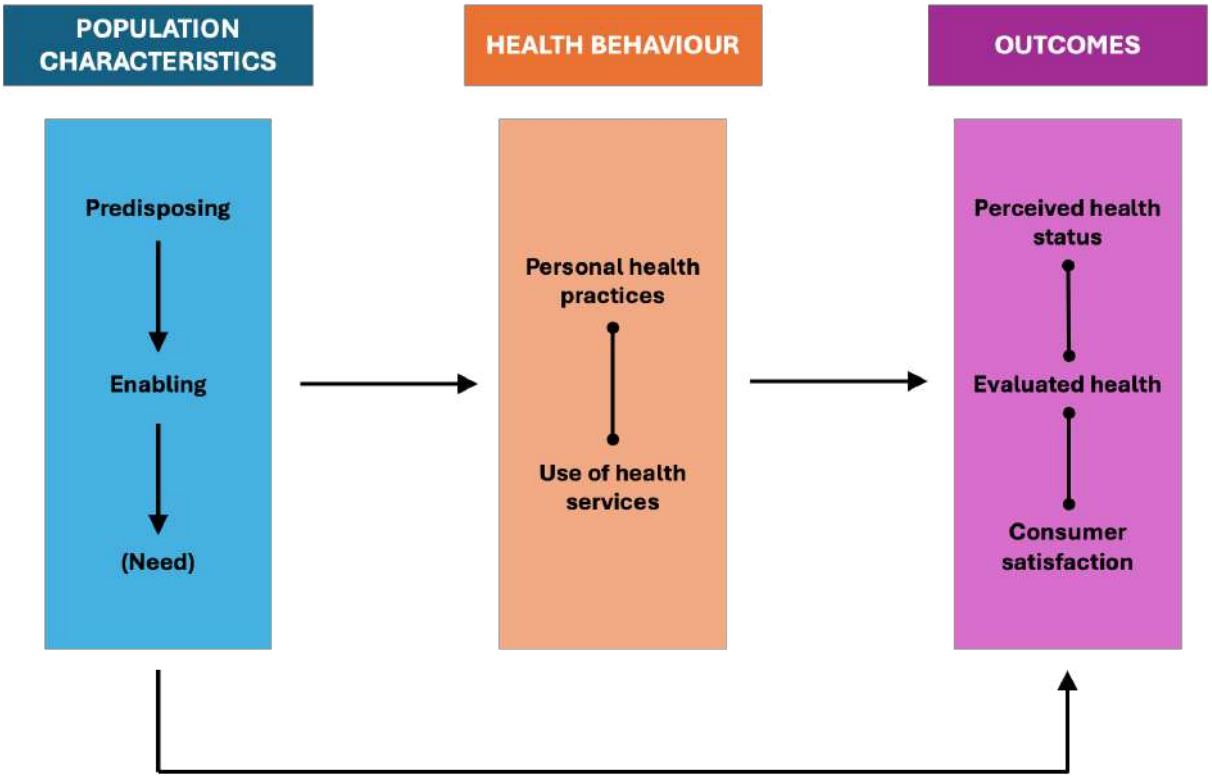



***Figure 3. Framework for viewing health service utilization, Ronald Andersen***

***ADVANTAGES OF THIS MODEL:*** An attempt was made to investigate the motivations behind family utilization of healthcare services with the original behavioral model. The model, however, used the individual rather than the family as the unit of analysis due to the diversity of family members. Andersen adds that the model can predict and explain how individuals use healthcare services. Health outcomes are the endpoint of interest in the Andersen conceptual framework, which stresses the individual as the analytical unit and goes beyond the use of health care. Unlike its predecessors, this model shows how needs and health-related beliefs can affect health outcomes. It also incorporates genetic predisposition as a predisposing factor and quality of life as an endpoint. By using the linkages in the framework, we may determine the directionality of the effect that results from a change in an individual's characteristics or environment. According to the Andersen model, more service utilization is predicted if an infection increases a person's need.

I chose the Andersen model for this research because it facilitates the integration of the many individual and social factors influencing health-seeking activity and correlate them with the results of that behavior.

***Javan-Noughabi (2022)***

They investigated the factors influencing the attendance of a diabetic self-management education program by conducting a cross-sectional study on 384 diabetes patients in Mashhad, Iran. According to the study, there was a lower likelihood of participation among women (OR=0.414), older persons (≥65 years, OR=0.159), those living more than 40 minutes away from the training center (OR=0.196), those in poor health (OR=0.282), and those who had had diabetes for more than five years (OR=0.176).

***Mou (2021)***

560 of the 1234 respondents in the China Health and Retirement Longitudinal Study (CHARLS) had undiagnosed diabetes. The study discovered strong correlations between age, medical insurance, residential locations, geographic regions, other chronic diseases, and self-perceived health status using multiple logistic regression.

***Lee (2021)***

193 outpatients with type 2 diabetes receiving insulin treatment were studied to verify the mediating effects of hemoglobin A1c, diabetes self-management behavior, and self-efficacy in managing diabetes, as well as to evaluate a hypothetical path model that estimated the health state of these patients. The researchers found that 55.0% of the variance in subjective health status was explained by the model. Diabetes-related knowledge, psychological insulin resistance, family support for diabetes treatment, diabetes self-care behaviours, and HbA1c were all found to have significant direct influences on subjective health status. Through diabetic self-care practices and HbA1c, diabetes management self-efficacy significantly and indirectly influenced subjective health status.

**Abbood (2023):**

For this study, 60 patients with diabetes receiving care at Primary Healthcare Centres in Baghdad were randomly selected and split into two groups: 30 patients in the experimental group and 30 patients in the control group. The purpose of the study was to ascertain how the Trans-theoretical Model improved behaviour related to controlling blood sugar levels(41).

The researchers found that the experimental group's glucose-controlling behaviour showed a highly significant difference between the pre-test and post-test I. Furthermore, a significantly significant distinction was seen between the pretest, post-test I, and post-test II.

**Rajab (2020):**

30 general practitioners and 151 patients with poorly managed type 2 diabetes who were indicated for insulin therapy were studied. Questionnaires based on autonomy, relatedness, and competency from the self-determination theory (SDT) were administered on patients. Patients' attitudes towards insulin therapy were measured using the Insulin Treatment Appraisal Scale (ITAS), while general practitioners' views were measured using a separate questionnaire. The patients had scored acceptably for competency, low for relatedness in the patient-doctor relationship, and lesser score for intrinsic motivation than for extrinsic motivation. The primary obstacle to insulin therapy was the 67.5% of patients' rejection of the illness's severity. 96.7% of GPs reported that the primary reason for delayed insulin prescription was low compliance.

Thus, after reviewing the literature, we understood that diabetes is a complex disease influenced by many genetic and environmental factors. This comprehensive overview delves into the various factors that contribute to the development and progression of diabetes. It is important to note that these factors often interact, and a combination of genetic, environmental, and lifestyle factors influences the development of diabetes. By addressing these factors and making healthy lifestyle choices, individuals can significantly reduce their risk of developing diabetes or managing it effectively if diagnosed. With the focus on insulin users among persons with type 2 diabetes, understanding the factors influencing healthy behavioral uptake among them seemed important. Andersen's behavioral model appropriately provides a framework for understanding these healthy behaviors. The findings from this approach can be applied to an individual level and a broader level to help insulin users maintain healthy behaviors.

# AIMS & OBJECTIVES

# ***AIMS & OBJECTIVES***

## *AIMS*

To explore the patterns of healthcare-seeking behavior amongst persons with Type 2 Diabetes in specified sub-constructs of healthcare-seeking and its potential influence on euglycemic/dys-glycaemic trajectories in reference to insulin users.

## *OBJECTIVES*

1. To ascertain the healthcare-seeking behavior of insulin users in terms of acceptance, readiness, facilitators & barriers to avail insulin therapy rooted in the Andersen model.

2. To understand the adjusted effect of the extent of healthcare-seeking behavior on glycaemic trajectories after accounting for epidemiological and clinical characteristics.

# METHODOLOGY

## *METHODOLOGY*

### STUDY DESIGN

Community-based (facility-based enrolment of participants), longitudinal, prospective study.

### STUDY SETTING

The study was conducted in the urban area of Bhopal district of Madhya Pradesh, in the urban field practice areas of the Department of Community and Family Medicine (CFM), AIIMS Bhopal. The population of Madhya Pradesh is 7.26 crores; Bhopal is the capital of the state and is the fourth largest district in the state by population, which is around 2,371,061(42).

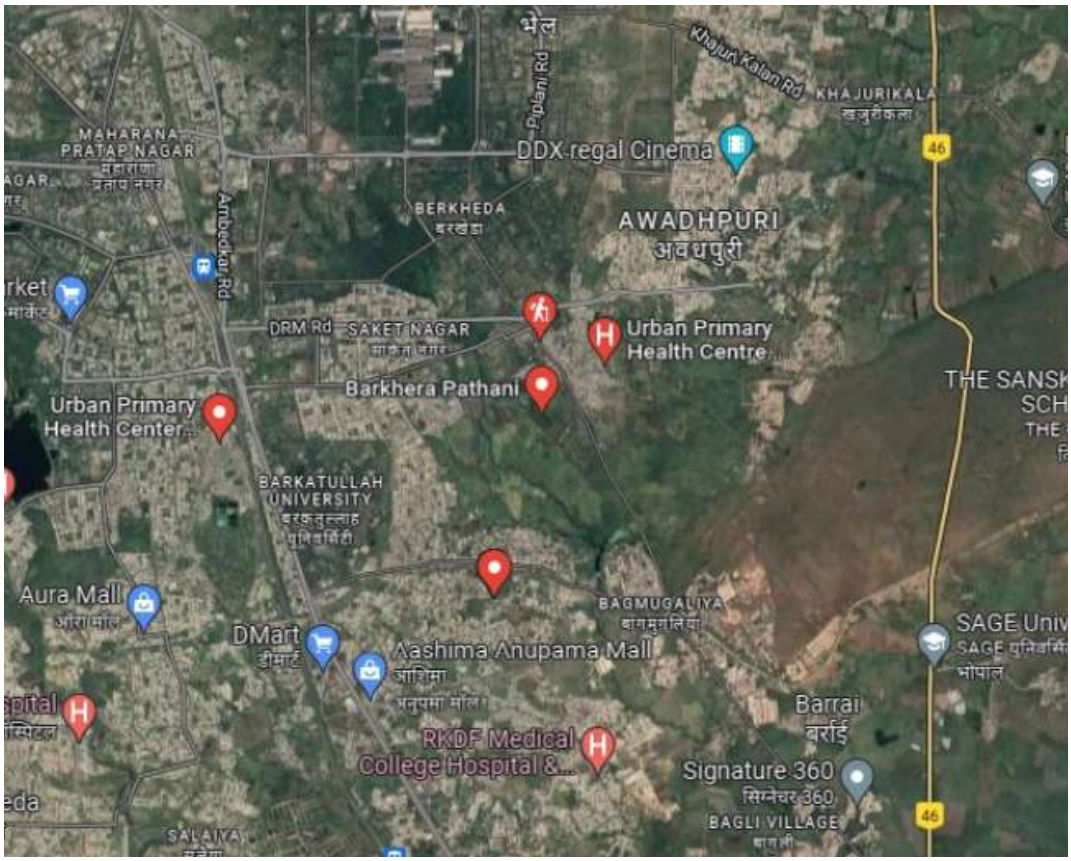



***Figure 4: Aerial map of the area serviced by UPHC of Saibaba Nagar and Barkheda Pathani (Google Maps)***

CUHA AIIMS, running the UPHC of Saibaba Nagar and Barkheda Pathani slums, provides comprehensive health care to improve the urban poor community. UPHC Saibaba Nagar caters to Ward 49 and Ward 50, and caters to a total population of 41,666. The UPHC Barkheda Pathani caters to a population of 34,874. A dedicated NCD clinic is running on both the UPHCs every Wednesday at Saibaba Nagar and every day at Barkheda Pathani, conducted by CUHA AIIMS Bhopal.

These study centers were chosen for operational feasibility.

**STUDY POPULATION**

Persons with type-2 diabetes residing within a 5 - 6 km radius of AIIMS, Bhopal and are currently on Insulin therapy. The enrolment was done from the 2 UPHCs primarily and the Diabetes clinic at AIIMS Bhopal secondarily.

The study frame was people with type 2 diabetes registered in the UPHCs and insulin users in AIIMS, Bhopal.

***Operational Definitions***

1. ***Health-seeking behavior:*** Any activity performed by those who believe they have a health issue or are ill with the goal of finding a suitable treatment. It was measured in terms of various subdomains like self-care practices and medication adherence.
2. ***Insulin adherence:*** When a patient takes their medications as directed by health professionals and sticks to the recommended dosage, timing, frequency, and advice. I used questions from the ARMS-D scale adjusted with respect to the current setting to understand this. A score >6 was considered satisfactory adherence.
3. ***SELF-Maintenance***: I used questions from the DSMQ scale adjusted concerning the current setting to understand this. A score >8 was considered satisfactory self-maintenance.

4. ***Low Persisters*****:** The average HbA1c level is less than 8
5. ***High Persisters*****:** The average HbA1c level is greater than 10
6. ***Achievers*****:** If the average HbA1c level is less than 10 or greater than 8, the net change is positive.
7. ***Degraders*****:** If the average HbA1c level is less than 10 or greater than 8, the net change is negative.
8. ***Optimal glycemic control:*** The high persisters & degraders were clubbed together and considered a bad glycemic control group.
9. ***Sub-optimal glycemic control:*** The low persisters and achievers were considered a good glycemic control group.
10. ***Treatment acceptance:*** This relates to how cultural and societal elements influence whether or not customers will accept the particular service or disease. In this study, questions from BMQ questionnaire were used after adjusting to our setting to assess it.
11. ***Hypertension***(43): Adults were defined as having HTN if they meet any of the following criteria:
    a. SBP 140 mmHg or greater or
    b. DBP 90 mmHg or greater, or
    c. current use of antihypertensive medication.
12. ***Pre-Hypertension***: Adults were defined as having HTN if they meet any of the following criteria:
    a. SBP 120 - 140 or
    b. DBP 80 - 90, or
13. ***Normotensive***: Adults were defined as having HTN if their BP was < 120/80
14. ***Asian BMI classification***(44)
    a. Underweight: BMI less than 18.5kg/m2
    b. Normal weight: BMI between 18.5 to 22.9kg/m2
    c. Overweight: BMI between 23 to 24.9kg/m2
    d. Obese: BMI above 25kg/m2

### STUDY PERIOD

The study period was 2 years from approval.

### *ELIGIBILITY CRITERIA*

#### INCLUSION CRITERIA

- All patients (≥18 & ≤80 years of age) attending the NCD clinic in UPHC of Barkheda Pathani and Sai Baba Nagar and the diabetes clinic at AIIMS Bhopal who were:
    - Diagnosed with having Type 2 diabetes
    - Insulin being prescribed for uncontrolled type 2 diabetes after a maximum dose or lack of control on dual oral therapy (alone or in combination with oral agents)
    - Using add-on insulin for ≥ 3 months

#### EXCLUSION CRITERIA

- Insulin prescribed for acute conditions like surgeries or infection
- Pancreatic insufficiency
- Chronic kidney disease (Stage 3 or more)
- Heart failure with reduced ejection fraction (NYHA 3 or more)
- Patients with severe mental illness, cognitive dysfunction or inability to read and write Hindi
- Gestational diabetes

### *Sample size and techniques*

#### SAMPLING METHOD

Purposive sampling (people fitting the selection criteria were selected until the required sample size was achieved) from consecutive patients attending NCD clinics at the selected facilities during the designated data collection period.

#### SAMPLE SIZE CALCULATION

The parameter to calculate the sample size of this study were taken by the study conducted in Bangladesh in 2020 where Participants who did not visit a physician or a healthcare centre during the past 3 months had twice the odds of having uncontrolled diabetes, compared with those who visited during the same period [OR 2.12, 95% CI (1.02–5.14), p = 0.04] and 28.7% participants satisfactory glycaemic control (HbA1c < 7%)(45).

We used the following formula for the sample size estimation-

$n_a$, for the absence group:

$n_a = [Z_{\alpha/2}^2 / \log^2(1\text{-}RP)] * [1/X + 1/Y]$

where,

$X = 1 / \rho_p(1-\rho_p)k$, and

$Y = 1 / \rho_a(1-\rho_a)$,

and $Z_{\alpha/2}$ is the critical value of the Normal distribution at $\alpha/2$ (e.g., for a confidence level of 95%, $\alpha$ is 0.05 and the critical value is 1.96), RP is the relative precision (the percentage by which the lower limit for your confidence interval is less than the estimated odds ratio), $\rho_p$ is the prevalence of the outcome in the presence group, $\rho_a$ is the prevalence of the outcome in the absence group, and k is the ratio of presences to absences being sampled ($n_p/n_a$).

With a relative precision of 50% and a confidence interval of 95%, the sample size calculated for a good glycaemic control group is 72. Hence the total sample size for the study was **72+72=144.**

**We took 150 insulin users for this study.**

### *Data Collection Tool*

#### QUANTITATIVE DATA COLLECTION

This was done using a questionnaire. First their socio-demographic and socio-economic information like Age (number), sex (Male/Female), area of residence (Urban/Rural), education(LP/UP/HS/higher), religion (Hindu/Muslim/Christian/other), caste category (UR/OBC/SC/ST), monthly income, occupation, any health insurance (Yes/No), family support (Yes/No), healthcare preference (allopathic/AYUSH/faith healing/others), distance from nearest point of care (5km/50km/more).

The disease-related information includes family history of diabetes (Yes/No), duration of diabetes, duration of insulin use, source of insulin, injection device used, total number of injections, type of insulin used, and whether hypertension medications are taken.

Questions to assess acceptance were made with the help of questions taken from the Beliefs About Medicines Questionnaire (BMQ). Questions taken from the Injection Technique Questionnaire (ITQ) and others using literature review were used to assess the facilitators and barriers to insulin use. Diabetic Self-Management Questionnaire (DSMQ) was used to understand self-maintenance in participants. Adherence to refills and medicines scale for diabetes (ARMS-D) will be used to understand insulin adherence. Questions from the Insulin Treatment Satisfaction Questionnaire (ITSQ) were used to understand the readiness and satisfaction of the participants regarding insulin use. The newly made questionnaire showed a relatively high index on content validation and was deployed after piloting them.

The questionnaire used to assess insulin adherence had six questions, each of which, when correct, was given a maximum score of 2, adding up to 12 marks.

Participants who scored >6 out of a total score of 12, were considered to have **relatively high adherence**, and <6 were considered to have **relatively low adherence**.

The questionnaire used to assess self-maintenance had 8 questions, each of which, when correct, was given a maximum score of 2. For diet & substance use questions, healthy diet & absence of substance use were given a score of 2. Otherwise, they were given 0. Came up to a total of 16 marks.

Participants who scored >8 out of a total score of 16, were considered to have **relatively high self-maintenance**, and <8 were considered to have **relatively low self-maintenance**.

Anthropometric measurements (Height, Weight, BMI), Clinical measurements like BP, LDL, serum creatinine & glycaemic control using HbA1c were also measured.

***Data Collection Procedure***

*Identification of people with diabetes:* After IHEC approval, data collection began. A diabetes clinic is run at AIIMS Bhopal, and a dedicated NCD clinic is run in Saibaba Nagar and Barkheda Pathani. All the people who were ≥18 & < 80 years of age, visiting for diabetes management, were registered there. These registered patients served as our sampling frame. Firstly, information about all these people was identified and compiled. The telephonic reminders were given to people who don't attend regularly.

*Collection of information regarding healthcare-seeking behavior:* after explaining the study and obtaining consent for participation, a structured and validated questionnaire was given to them to retrieve necessary information.

The questionnaire was used to identify the factors influencing health-seeking with the help of the structural framework provided by Andersen's behavioral model. Change in glycaemic control was measured using HbA1c from UPHCs and AIIMS Bhopal laboratory at the baseline and the next follow-up visit after 6 months.

Anthropometric measurements (Height, Weight, BMI), BP, LDL, and serum creatinine were done. These investigations were also done using UPHCs and AIIMS Bhopal's hospital services. This information was our baseline data. Explanations about the consequent follow-up visit after 6 months were also given.

*Follow-up*: All these patients were contacted again for a second follow-up visit to collect data directly or telephonically during their subsequent visit. Repeat HbA1c measurements were done then.

**Procedure – Recruitment (Schematic Diagram)**

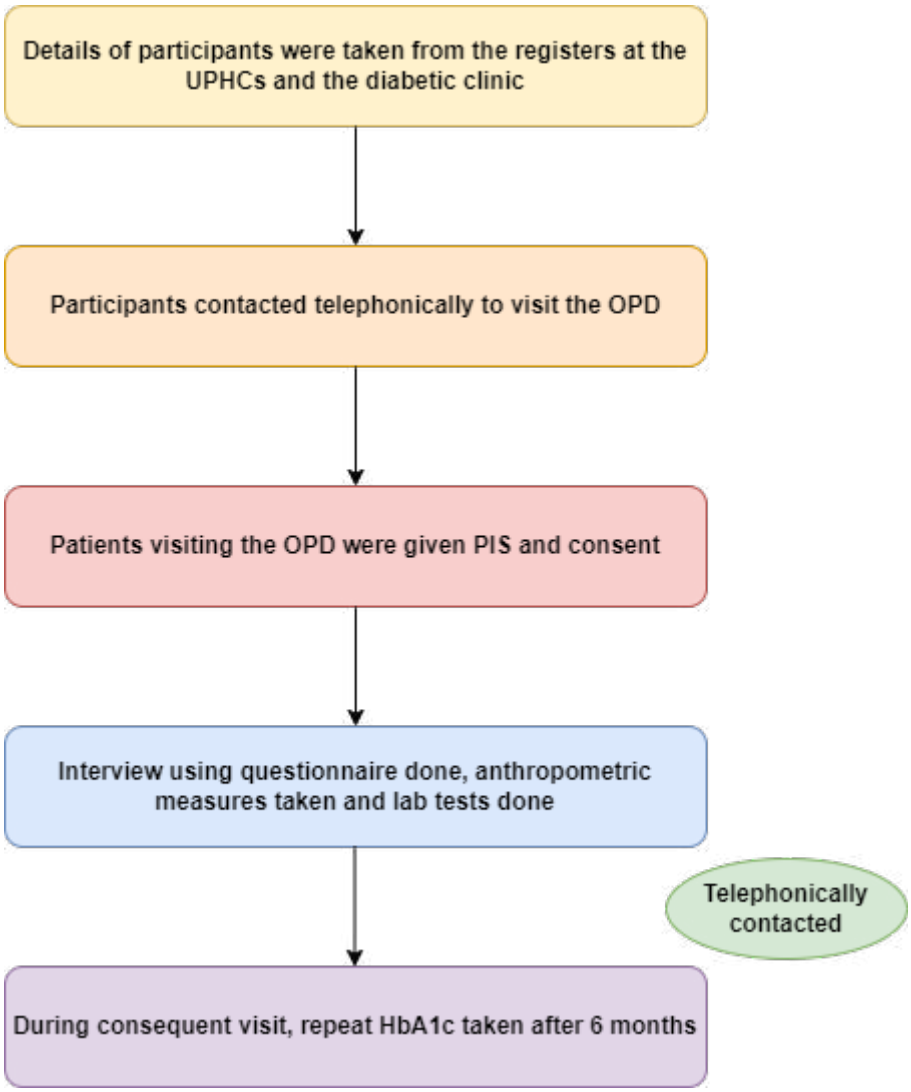

Details of participants were taken from the registers at the UPHCs and the diabetic clinic
Participants contacted telephonically to visit the OPD
Patients visiting the OPD were given PIS and consent
Interview using questionnaire done, anthropometric measures taken and lab tests done
Telephonically contacted
During consequent visit, repeat HbA1c taken after 6 months

***Figure 5 shows the schematic diagram of the participant recruitment process***

***Objective 1:***

Andersen's behavioral model of health service was utilized to understand the extent of the healthcare-seeking behavior of insulin users with type 2 diabetes. Healthcare utilization is the point in the health system where patients' needs meet the professional healthcare system(46). The model incorporates both individual and contextual determinants of healthcare services use and describes them in three major components as follows:

1. ***PREDISPOSING FACTORS:***
   Individual predisposing factors like demographic characteristics of age and sex, social factors such as education and occupation, and diabetes-related factors like duration of disease, insulin use, injection number and type used, etc.
   Also, we tried to capture acceptance using questions taken from Beliefs About Medicines Questionnaire (BMQ).

2. ***ENABLING FACTORS:***
   Individual financing factors like income and health insurance status.
   At the contextual level, family support, source of knowledge and counseling, and access to specialists like endocrinologists, dieticians, diabetic educators, etc. Also, other questions taken from the Injection Technique Questionnaire (ITQ) were used to understand the facilitators and barriers of participants for taking insulin.

3. ***NEED FACTORS:***
   Perceived need for health was assessed using the perceived severity of the condition, anxiety due to the condition, pressure by friends/family, comparison with peers, and skepticism of modern medicine based in questions taken from the Insulin Treatment Satisfaction Questionnaire (ITSQ).

Health behavior was assessed by 2 domains: self-maintenance, which was assessed using questions from the Diabetes Self-Management Questionnaire (DSMQ), and insulin adherence, which was assessed using questions taken from the Adherence to Refills and Medicines Scale for Diabetes (ARMS-D) questionnaire. Scores for insulin adherence & self-maintenance were given and were considered satisfactory if they scored more than half of the total score. Each socio-demographic variable was given a higher score if it predisposed them to positive health behaviors to create a composite socio-demographic score. The participants were then divided into three equal tertiles to make a composite socio-demographic score category for comparing them with glycemic control groups. Participants with better clinical status at baseline were given a higher score to create a composite clinical condition score. The participants were then divided into three equal tertiles to make a composite clinical condition score category for comparing them with glycemic control groups.

**Objective 2:**

The absolute difference between the two HbA1c readings taken 6 months apart was taken to get the glycemic control. Also, the arithmetic mean of the two readings was taken. Then, they were classified into various glycemic trajectory groups as follows:

- **Low-persisters:** The average HbA1c level is less than 8
- **High-persisters:** The average HbA1c level is greater than 10
- **Achievers:** If the average HbA1c level is less than 10, greater than 8, the net change is positive.
- **Degraders:** If the average HbA1c level is less than 10 or greater than 8, the net change is negative.

$\Rightarrow$ The high persisters, degraders, and oscillators will be clubbed together and considered a **bad glycemic control** group.

$\Rightarrow$ The low persisters and achievers will be considered a **good glycemic control** group.

Significant clinical, anthropometric, Dietary patterns, Physical activity, tobacco/alcohol use, epidemiological factors, and other behavioral factors measured at baseline are used to predict the glycemic control in the participants.

We created 2 models driven by the theory of Andersen model. The first model tries to look into how the glycemic status of a patient is influenced by the adherence score of the patients from a multivariate perspective where socio-demographic composite scores and clinical condition composite scores are considered covariables and are adjusted through a logistic regression model. Constructing of the composite socio-demographic score category and composite clinical condition category are given in annexures. Thus, the model can be defined as follows:

Glycemic status ~ intercept + composite clinical condition score category + composite SES score category + adherence score tertiles + $\varepsilon_0$

Where, $\varepsilon_0$ is the error in the model.

The second model tries to look into how the glycemic status of a patient is influenced by the self-maintenance score of the patients from a multivariate perspective where socio-demographic composite scores and clinical condition composite scores are considered covariables and are adjusted through a logistic regression model. Thus, the model can be defined as follows:

Glycemic status ~ intercept + composite clinical condition score category + composite SES score category + self-maintenance score tertiles + $\varepsilon_0$

Where, $\varepsilon_0$ is the error in the model.

**Statistical Analysis:**

- Data was entered on an Excel sheet.
- The variables were coded numerically, and a code sheet was generated.
- The data was checked for outliers, duplications, and redundancies and was cleaned.
- Data analysis was done on the R software version 4.4.1.
- To summarize the data, frequencies, and percentages were used for qualitative data, and mean with standard deviations for quantitative data.
- For analysis, the relationship between two categorical variables was assessed using the Chi-square test and Fischer's exact test.
- To test the association between continuous variables, we used an independent t-test and Wilcoxon rank sum test to test the difference in the distribution of numerical variables.
- A generalized linear model was used to perform multivariable logistic regression analysis.
- To understand the relationship between Insulin adherence and Glycemic control, a logistic regression model was made, adjusting for socio-demographic & clinical factors.
- To understand the relationship between Self-maintenance and Glycemic control, a logistic regression model was made, adjusting for socio-demographic & clinical factors.
- Diagnostics tests were performed in R 4.4.1 software to test the multivariable logistic regression analysis assumptions.

# RESULTS

## ***RESULTS***

After reviewing the NCD registers of Saibaba Nagar, Barkheda Pathani health clinics & the diabetes clinic of AIIMS Bhopal, we identified 324 insulin-using patients. During the data collection period, all 324 participants were contacted either during their regular visits or telephonically. Of those, 211 participants fit our inclusion criteria. Among them, 19 participants did not consent to participate, and the remaining participants were included, and data was collected until the necessary sample size of 150 was reached.

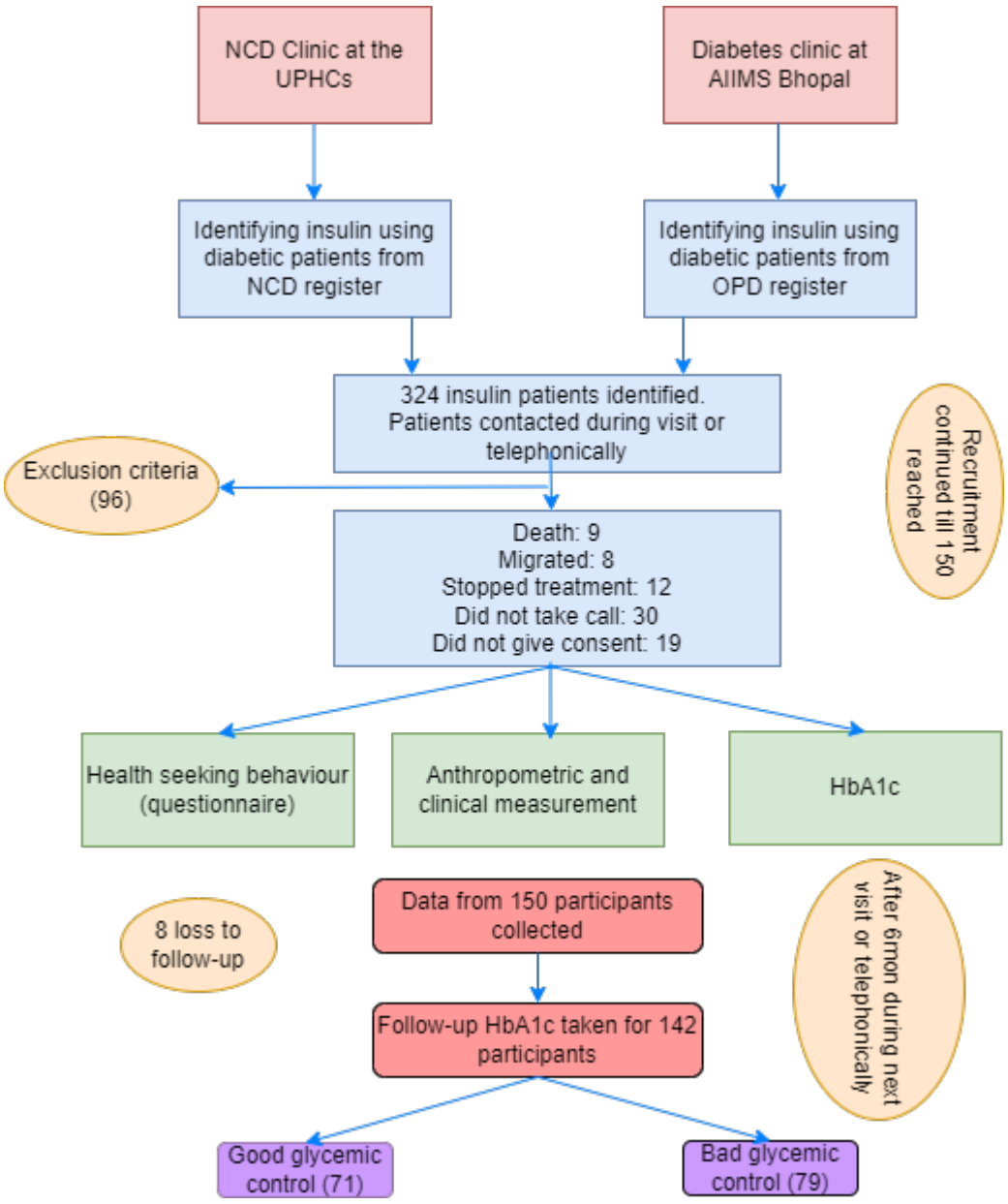

NCD Clinic at the UPHCs
Diabetes clinic at AIIMS Bhopal
Identifying insulin using diabetic patients from NCD register
Identifying insulin using diabetic patients from OPD register
324 insulin patients identified. Patients contacted during visit or telephonically
Exclusion criteria (96)
Recruitment continued till 150 reached
Death: 9
Migrated: 8
Stopped treatment: 12
Did not take call: 30
Did not give consent: 19
Health seeking behaviour (questionnaire)
Anthropometric and clinical measurement
HbA1c
8 loss to follow-up
Data from 150 participants collected
After 6mon during next visit or telephonically
Follow-up HbA1c taken for 142 participants
Good glycemic control (71)
Bad glycemic control (79)

***Figure 6: Flowchart showing the approach for data collection***

**Descriptive**

***Table 1: socio-demographic information of the participants among the insulin-only group and the insulin + OHA group. (N=150).***

| Characteristic | **Overall**, N = 150[1] | **Insulin**, N = 40[1] | **OHA + Insulin**, N = 110[1] |
|---|---|---|---|
| Age | 55 (12) | 67 (8) | 51 (11) |
| Age category | | | |
| <45 | 16 (11%) | 0 (0%) | 16 (15%) |
| 45-60 | 51 (34%) | 5 (13%) | 46 (42%) |
| >60 | 83 (55%) | 35 (88%) | 48 (44%) |
| Sex | | | |
| Female | 76 (51%) | 20 (50%) | 56 (51%) |
| Male | 74 (49%) | 20 (50%) | 54 (49%) |
| Religion | | | |
| Hindu | 126 (84%) | 33 (83%) | 93 (85%) |
| Non-Hindu | 24 (16%) | 7 (18%) | 17 (15%) |
| Caste | | | |
| General | 25 (17%) | 9 (23%) | 16 (15%) |
| OBC | 97 (65%) | 26 (65%) | 71 (65%) |
| SC/ST | 28 (19%) | 5 (13%) | 23 (21%) |

[1] Mean (SD); n (%)

Table 1 shows the socio-demographic distribution of the participants among the insulin-only group and the insulin + OHA group. Out of the total participants, 40 were using only

insulin, and 110 were using both insulin and OHAs. Most of the participants were aged between >60 years in both groups, followed by participants aged between 45-60 years. Participants using only insulin were older, with a mean age of 67, with 88% being >60 years old. Male and female participants were almost equal in number in both groups. Most participants followed the Hindu religion in both groups, and the majority (65% each) belonged to the OBC category.

***Table 2: socio-economic information of the participants among the insulin-only group and the insulin + OHA group. (N=150).***

| **Characteristic** | **Overall**, N = 150[1] | **Insulin**, N = 40[1] | **OHA + Insulin**, N = 110[1] |
|---|---|---|---|
| Education | | | |
| Graduate & above | 39 (26%) | 8 (20%) | 31 (28%) |
| Upto intermediate | 64 (43%) | 16 (40%) | 48 (44%) |
| Upto Primary | 47 (31%) | 16 (40%) | 31 (28%) |
| Occupation | | | |
| Govt. sector | 17 (11%) | 0 (0%) | 17 (15%) |
| Self-employed/Private Sector | 48 (32%) | 8 (20%) | 40 (36%) |
| Unemployed/Homemaker/Retired | 85 (57%) | 32 (80%) | 53 (48%) |
| Monthly income | | | |
| < 10,000 Rs | 74 (49%) | 25 (63%) | 49 (45%) |
| 10,000 - 50,000 Rs | 46 (31%) | 14 (35%) | 32 (29%) |
| >50,000 Rs | 30 (20%) | 1 (2.5%) | 29 (26%) |

[1] n (%)

Table 2 shows the socioeconomic distribution of the participants among the insulin-only group and the insulin + OHA group. Most participants in both groups had completed up to intermediate level education, followed by upto primary level. Most of the participants

from both groups belonged to the category of Unemployed/Homemaker/Retired, followed by Self-employed/Private Sector. Most of the participants from both groups had a monthly income of > 10,000 Rs, followed by 10,000 – 50,000 Rs in both categories.

***Table 3: disease status information of the participants among the insulin-only group and the insulin + OHA group. (N=150).***

| **Characteristic** | **Overall**, N = 150[1] | **Insulin**, N = 40[1] | **OHA + Insulin**, N = 110[1] |
|---|---|---|---|
| Family history of diabetes | 72 (48%) | 17 (43%) | 55 (50%) |
| Duration of diabetes (years) | 12 (7) | 20 (5) | 9 (4) |
| Duration of insulin use (years) | 2.66 (2.92) | 4.46 (3.69) | 2.00 (2.27) |
| Number of comorbidities | | | |
| ≥2 | 26 (17%) | 10 (25%) | 16 (15%) |
| 1 | 72 (48%) | 21 (53%) | 51 (46%) |
| None | 52 (35%) | 9 (23%) | 43 (39%) |
| On HTN medication | 85 (57%) | 19 (48%) | 66 (60%) |

[1] n (%); Mean (SD)

Table 3 shows the disease status information of the participants among the insulin-only group and the insulin + OHA group. Nearly half the participants in both groups have a family history of diabetes. The mean duration of diabetes was higher in the insulin-only group, 20 years, and 9 years in the other group. The mean duration of insulin use was also higher in the insulin-only group, 4.46 years, and 2 years in the other group. More proportion (39%) of the participants in the insulin + OHA group had no comorbidities than 23% in the other group. A higher proportion, i.e., 60% of the participants in the insulin + OHA group were already on hypertension medications as compared to 48% in the other group.

***Table 4: Information on injection-related participants among the insulin-only group and the insulin + OHA group. (N=150).***

| **Characteristic** | **Overall**, N = 150[1] | **Insulin**, N = 40[1] | **OHA + Insulin**, N = 110[1] |
|---|---|---|---|
| Injection device | | | |
| Pen | 106 (71%) | 23 (58%) | 83 (75%) |
| Syringe | 44 (29%) | 17 (43%) | 27 (25%) |
| Total daily injections | | | |
| >2 | 23 (15%) | 6 (15%) | 17 (15%) |
| ≤2 | 127 (85%) | 34 (85%) | 93 (85%) |
| Type Insulin being used | | | |
| Lantus alone | 61 (41%) | 10 (25%) | 51 (46%) |
| Mixtard | 66 (44%) | 24 (60%) | 42 (38%) |
| Regular + Lantus | 23 (15%) | 6 (15%) | 17 (15%) |

[1] n (%)

Table 4 shows the injection-related information of the participants among the insulin-only group and the insulin + OHA group. Most participants used the pen as their injection device in both groups, with a higher proportion (75%) using a pen among the insulin + OHA group. Most participants took ≤2 injections per day in both groups. Most participants (60%) in the insulin-only group were using mixtard type of insulin, and most participants (46%) in the insulin + OHA group used lantus alone.

***Table 5: Baseline clinical characteristics of the participants among the insulin-only group and the insulin + OHA group. (N=150).***

| **Characteristic** | **Overall**, N = 150[1] | **Insulin**, N = 40[1] | **OHA + Insulin**, N = 110[1] |
|---|---|---|---|
| SBP | 138 (15) | 144 (14) | 136 (15) |
| HTN control status | | | |
| Controlled | 30 (35%) | 4 (21%) | 26 (39%) |
| Uncontrolled | 55 (65%) | 15 (79%) | 40 (61%) |
| Non-hypertensive | 65 | 21 | 44 |
| Creatinine levels | | | |
| >1.2 mg/dL | 24 (18%) | 6 (17%) | 18 (19%) |
| <1.2 mg/dL | 108 (82%) | 29 (83%) | 79 (81%) |
| Missing | 18 | 5 | 13 |
| Dyslipidemia | | | |
| LDL (>100 mg/dL) | 30 (25%) | 10 (29%) | 20 (23%) |
| LDL (<100 mg/dL) | 90 (75%) | 24 (71%) | 66 (77%) |
| Missing | 30 | 6 | 24 |
| HbA1c (Baseline) | 9.24 (1.89) | 9.76 (2.26) | 9.05 (1.71) |

[1] Mean (SD); n (%)

Table 5 shows the baseline clinical characteristics of the participants among the insulin-only group and the insulin + OHA group. Participants in the insulin-only group had a higher mean systolic BP of 144 compared to 136 in the other group. The majority of the participants in both groups had uncontrolled hypertension, with a higher proportion (79%) being in the insulin-only group. Most of the participants in both groups had normal

creatinine & LDL levels. Mean HbA1c readings at the baseline were higher (9.76) for the insulin-only group compared to 9.05 in the other group.

***Table 6: Level of HbA1c in participants who use insulin alone and insulin with OHAs at Baseline(N=150)***

| **Characteristic** | **Insulin**, N = 40[1] | **OHA + Insulin**, N = 110[1] | **p-value**[2] |
|---|---|---|---|
| Baseline HbA1c | | | **0.051** |
| <7 | 6 (14%) | 11 (10%) | |
| 7 – 10 | 17 (43%) | 71 (65%) | |
| >10 | 17 (43%) | 28 (25%) | |

[1] n (%)

[2] Fisher's exact test

Table 6 shows the baseline glycemic control participants among the insulin-only group and the insulin + OHA group. Most participants belonged to the 7 – 10 category in both groups. Also, a higher proportion of participants (43%) were present in the >10 category for the insulin-only group as compared to the other group (25%).

**Healthcare-seeking behavior**

Healthcare-seeking behavior was assessed by 2 domains: self-maintenance, which was assessed using questions from the diabetes self-management questionnaire (DSMQ), and insulin adherence, which was assessed using questions taken from the Adherence to Refills and Medicines Scale for Diabetes (ARMS-D) questionnaire. Both questionnaires were adjusted to use only the necessary questions. The newly made questionnaire showed a relatively high index on content validation and was deployed after piloting them.

**Questionnaire to assess Insulin adherence**

The questionnaire used to assess insulin adherence had 6 questions, each of which, when correct, was given a maximum score of 2, which added up to a total of 12 marks.

Participants who scored **>6** out of a total score of 12, were considered to have **relatively high adherence**, and **<6** were considered to have **relatively low adherence**.

All participants' mean (SD) adherence score was **8.19** (2.18).

**Questions used to assess insulin adherence:**

**Questions**

Q1. Forgot to take insulin in the past 4 weeks (fogot_insulin)

Q2. Decided not to take insulin in the past 4 weeks (deliberately_stopped)

Q3. Refilling insulin in the past 4 weeks before running out (refill_insulin)

Q4. Stopping insulin when I feel better (stopped_when_felt_better)

Q5. Adapting insulin doses to current blood glucose levels (adapt_dose_to_rbs)

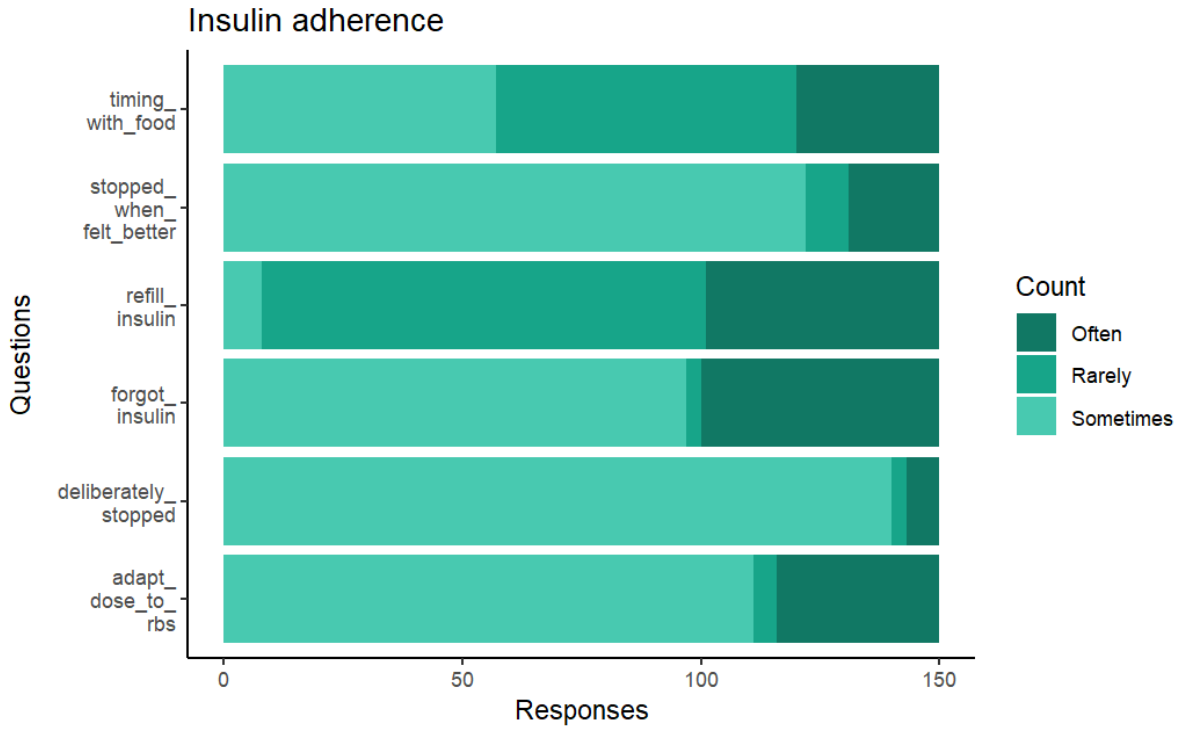
Q6. Adjusting the timing of your insulin injection to food intake (timing_with_food)

***Table 7: Distribution of responses among participants for each adherence question(N=150)***

| | forgot_ insulin | deliberately_ stopped | refill_ insulin | stopped_ when_ felt_better | adapt_ dose_to_ rbs | timing_ with_food |
|---|---|---|---|---|---|---|
| Rarely | 3 (2%) | 3 (2%) | 93 (62%) | 9 (6%) | 5 (3%) | 63 (42%) |
| Sometimes | 97 (65%) | 140 (93%) | 8 (5%) | 122 (81%) | 111 (74%) | 57 (38%) |
| Often | 50 (33%) | 7 (5%) | 49 (33%) | 19 (13%) | 34 (23%) | 30 (20%) |

Table 7 shows the number of participants who picked each response for each question

***Figure 7: the distribution of each response by participants for each question related to insulin adherence***




The above bar chart depicts the number of participants who selected each response to the different questions used to assess insulin adherence.

***Table 8: The sociodemographic characteristics of the participants having Relatively high and low insulin adherence(N=150)***

| Characteristic | **Overall**, N = 150[1] | **Relatively high adherence**, N = 121[1] | **Relatively low adherence**, N = 29[1] | **p-value**[2] |
|---|---|---|---|---|
| Age category | | | | 0.090 |
| <45 | 16 (11%) | 11 (9.1%) | 5 (17%) | |
| 45-60 | 51 (34%) | 38 (31%) | 13 (45%) | |
| >60 | 83 (55%) | 72 (60%) | 11 (38%) | |
| Occupation | | | | 0.054 |
| Govt. sector | 17 (11%) | 17 (14%) | 0 (0%) | |
| Self-employed/Private Sector | 48 (32%) | 36 (30%) | 12 (41%) | |
| Unemployed/Homemaker/Retired | 85 (57%) | 68 (56%) | 17 (59%) | |
| Monthly income | | | | 0.089 |
| < 10,000 Rs | 74 (49%) | 56 (46%) | 18 (62%) | |
| 10,000 - 50,000 Rs | 46 (31%) | 42 (35%) | 4 (14%) | |
| >50,000 Rs | 30 (20%) | 23 (19%) | 7 (24%) | |

[1] n (%)

[2] Fisher's exact test; Pearson's Chi-squared test

Table 8 shows the sociodemographic characteristics of the participants having Relatively high and low insulin adherence. The majority of the participants (60%) with relatively high adherence belonged to >60 years of age, and most of the participants (45%) in the relatively low adherence belonged to the 45-60 year group. Most of the participants in both groups belong to the Unemployed/Homemaker/Retired category. Most participants in both groups have a monthly income of < 10,000 Rs.

***Table 9: The disease-related characteristics of the participants having Relatively high and low insulin adherence(N=150)***

| Characteristic | **Overall**, N = 150[1] | **Relatively high adherence**, N = 121[1] | **Relatively low adherence**, N = 29[1] | **p-value**[2] |
|---|---|---|---|---|
| Injection device | | | | 0.5 |
| Pen | 106 (71%) | 87 (72%) | 19 (66%) | |
| Syringe | 44 (29%) | 34 (28%) | 10 (34%) | |
| Total daily injections | | | | 0.4 |
| >2 | 23 (15%) | 17 (14%) | 6 (21%) | |
| ≤2 | 127 (85%) | 104 (86%) | 23 (79%) | |
| Type of insulin used | | | | 0.2 |
| Lantus alone | 61 (41%) | 53 (44%) | 8 (28%) | |
| Mixtard | 66 (44%) | 51 (42%) | 15 (52%) | |
| Regular + Lantus | 23 (15%) | 17 (14%) | 6 (21%) | |
| On HTN medication | | 73 (60%) | 12 (41%) | 0.064 |

[1] n (%); Median (IQR)

[2] Fisher's exact test; Pearson's Chi-squared test

Table 9 shows the disease-related characteristics of the participants having Relatively high and low insulin adherence. Most participants in both groups used the pen as their injection device. Most of the participants in both groups took ≤2 injections per day. Most participants in the relatively high adherence group used lantus alone and in the low adherence group used mixtard. Most of the participants (60%) in the relatively high adherence group were already taking anti-hypertensive medications.

***Table 10: The Perceived acceptance of treatment of the participants having Relatively high and low insulin adherence(N=150)***

| | | *Insulin adherence* | | |
|---|---|---|---|---|
| **Characteristic** | **Overall**, N = 150[1] | **Relatively high adherence**, N = 121[1] | **Relatively low adherence**, N = 29[1] | **p-value**[2] |
| **Dependency on insulin** | | | | **0.004** |
| Agree | 116 (77%) | 100 (83%) | 16 (55%) | |
| Uncertain | 32 (21%) | 20 (17%) | 12 (41%) | |
| Disagree | 2 (1.3%) | 1 (0.8%) | 1 (3.4%) | |
| **Concern regarding insulin side effects** | | | | 0.11 |
| Agree | 8 (5.3%) | 5 (4.1%) | 3 (10%) | |
| Uncertain | 27 (18%) | 25 (21%) | 2 (6.9%) | |
| Disagree | 115 (77%) | 91 (75%) | 24 (83%) | |

[1] n (%)

[2] Fisher's exact test

Table 10 shows the perceived acceptance of insulin use by the participants who had relatively high and low insulin adherence. Most participants agreed to be dependent on their insulin injection, with a higher proportion of participants agreeing from the relatively high adherence group (83%) compared to the other group (55%). Most participants disagreed with being concerned regarding the effects of insulin, with a higher proportion (83%) from the relatively low adherence group disagreeing as compared to the other group (75%).

***Table 11: The Perceived acceptance of treatment of the participants having Relatively high and low insulin adherence(N=150)***

| | | *Insulin adherence* | | |
|---|---|---|---|---|
| **Characteristic** | **Overall**, N = 150[1] | **Relatively high adherence**, N = 121[1] | **Relatively low adherence**, N = 29[1] | **p-value**[2] |
| **Disruption of daily activity by insulin** | | | | **0.036** |
| Agree | 53 (35%) | 41 (34%) | 12 (41%) | |
| Uncertain | 8 (5.3%) | 4 (3.3%) | 4 (14%) | |
| Disagree | 89 (59%) | 76 (63%) | 13 (45%) | |
| **Perceived harm by insulin use** | | | | **<0.001** |
| Agree | 6 (4.0%) | 4 (3.3%) | 2 (6.9%) | |
| Uncertain | 12 (8.0%) | 2 (1.7%) | 10 (34%) | |
| Disagree | 132 (88%) | 115 (95%) | 17 (59%) | |
| **Necessity for starting insulin** | | | | **0.023** |
| Agree | 125 (83%) | 105 (87%) | 20 (69%) | |
| Uncertain | 24 (16%) | 16 (13%) | 8 (28%) | |
| Disagree | 1 (0.7%) | 0 (0%) | 1 (3.4%) | |

[1] n (%)

[2] Fisher's exact test

Table 11 also shows the perceived acceptance of insulin use of the participants who had relatively high and low insulin adherence. Most participants disagreed with having their daily activities disrupted by insulin use, with a higher proportion of participants

disagreeing from the relatively high adherence group (63%) compared to the other group (45%). Most participants disagreed that their insulin caused more harm than good, with a higher proportion (95%) from the relatively high adherence group disagreeing as compared to the other group (59%). Also most participants agreed that it was necessary to start insulin with a higher proportion in high adherence group (87%) compared to the low (69%).

***Table 12: The Perceived readiness to treatment of the participants having Relatively high and low insulin adherence(N=150)***

| | | *Insulin adherence* | | |
|---|---|---|---|---|
| **Characteristic** | **Overall**, N = 150[1] | **Relatively high adherence**, N = 121[1] | **Relatively low adherence**, N = 29[1] | **p-value**[2] |
| **Perceived severity of the condition** | | | | 0.7 |
| Mild | 35 (23%) | 29 (24%) | 6 (21%) | |
| Uncertain | 43 (29%) | 33 (27%) | 10 (34%) | |
| Severe | 72 (48%) | 59 (49%) | 13 (45%) | |
| **Perceived anxiety due to diabetes** | | | | **0.029** |
| Often | 7 (4.7%) | 6 (5.0%) | 1 (3.4%) | |
| Sometimes | 43 (29%) | 40 (33%) | 3 (10%) | |
| Rarely | 100 (67%) | 75 (62%) | 25 (86%) | |

[1] n (%)

[2] Pearson's Chi-squared test; Fisher's exact test

Table 12 shows the perceived readiness to start insulin use for the participants who had relatively high and low insulin adherence. Most participants considered their condition to be severe, with a higher proportion of participants being from the relatively high adherence group (49%) as compared to the other group (45%). Most participants claimed to rarely feel anxious when thinking about their condition, with a higher proportion (86%) being from the relatively low adherence group as compared to the other group (62%).

***Table 13: The Perceived readiness to treatment of the participants having Relatively high and low insulin adherence(N=150)***

| | | *Insulin adherence* | | |
|---|---|---|---|---|
| **Characteristic** | **Overall**, N = 150[1] | **Relatively high adherence**, N = 121[1] | **Relatively low adherence**, N = 29[1] | **p-value**[2] |
| **Pressure from friends/family to visit the doctor** | | | | 0.060 |
| Often | 25 (17%) | 22 (18%) | 3 (10%) | |
| Sometimes | 108 (72%) | 89 (74%) | 19 (66%) | |
| Rarely | 17 (11%) | 10 (8.3%) | 7 (24%) | |
| **Condition as compared to peers** | | | | 0.7 |
| Better | 2 (1.3%) | 2 (1.7%) | 0 (0%) | |
| Same | 71 (47%) | 59 (49%) | 12 (41%) | |
| Worse | 77 (51%) | 60 (50%) | 17 (59%) | |
| **Skepticism in modern medicine** | 38 (25%) | 29 (24%) | 9 (31%) | 0.4 |

[1] n (%)

[2] Pearson's Chi-squared test; Fisher's exact test

Table 13 also shows the perceived readiness to start insulin use for the participants who had relatively high and low insulin adherence. Most participants said they received pressure from friend's/family sometimes, with a higher proportion of participants being from the relatively high adherence group (74%) compared to the other group (66%). Most participants considered their condition to be worse than their peers, with a higher proportion (59%) from the relatively low adherence group as compared to the other group (50%). 3/4$^{th}$ the participants had no skepticism in modern medicine, with a higher proportion among the relatively low adherence group (31%) compared to the other group (24%).

Table 14: The Facilitators of insulin use of the participants having Relatively high and low insulin adherence(N=150)

| | *Insulin adherence* | | | |
|---|---|---|---|---|
| **Characteristic** | **Overall**, N = 150[1] | **Relatively high adherence**, N = 121[1] | **Relatively low adherence**, N = 29[1] | **p-value**[2] |
| **Health insurance coverage** | 24 (16%) | 17 (14%) | 7 (24%) | 0.3 |
| **Family help for insulin use** | 31 (21%) | 27 (22%) | 4 (14%) | 0.3 |
| **Injection instructor** | | | | 0.2 |
| Diabetes Specialist | 73 (49%) | 62 (51%) | 11 (38%) | |
| General Practitioner | 77 (51%) | 59 (49%) | 18 (62%) | |
| **Latest injection instruction** | | | | **0.014** |
| <6 months | 141 (94%) | 117 (97%) | 24 (83%) | |
| >6 months | 9 (6.0%) | 4 (3.3%) | 5 (17%) | |
| **Insulin source** | | | | 0.6 |
| Nearby medical store | 61 (41%) | 48 (40%) | 13 (45%) | |
| Treating hospital | 89 (59%) | 73 (60%) | 16 (55%) | |

[1] n (%)

[2] Fisher's exact test; Pearson's Chi-squared test

Table 14 shows the facilitators for insulin use of the participants who had relatively high and low insulin adherence. Less than 1/4$^{th}$ of the participants said that they had insurance coverage, with a higher proportion from the relatively low adherence group (24%) as

compared to the other group. Less than 1/4 of the participants said they received any kind of help from their family in taking insulin, with a higher proportion (22%) being from the relatively high adherence group than the other group. A higher proportion (52%) of participants in the relatively high adherence group said they received their injection training from a diabetic specialist than the other group (38%). A majority of the participants had a review of the injection instructions within 6 months, with a higher proportion being from the relatively high adherence group (97%) than the other group (83%). Most participants got their insulin from their treating hospitals, with a higher proportion (60%) being from the relatively high adherence group than the other group (55%).

***Table 15: The Barriers to insulin use of the participants having Relatively high and low insulin adherence(N=150)***

| | | *Insulin adherence* | | |
|---|---|---|---|---|
| **Characteristic** | **Overall**, N = 150[1] | **Relatively high adherence**, N = 121[1] | **Relatively low adherence**, N = 29[1] | **p-value**[2] |
| **Feeling embarrassed due to insulin** | | | | 0.5 |
| Often | 99 (66%) | 77 (64%) | 22 (76%) | |
| Sometimes | 25 (17%) | 21 (17%) | 4 (14%) | |
| Rarely | 26 (17%) | 23 (19%) | 3 (10%) | |
| **Feeling frustrated due to strict schedule** | | | | **0.038** |
| Often | 115 (77%) | 92 (76%) | 23 (79%) | |
| Sometimes | 30 (20%) | 27 (22%) | 3 (10%) | |
| Rarely | 5 (3.3%) | 2 (1.7%) | 3 (10%) | |

[1] n (%)

[2] Pearson's Chi-squared test; Fisher's exact test

Table 15 shows the barriers for insulin use of the participants who had relatively high and low insulin adherence. Most participants said they often felt embarrassed due to insulin injection, with a higher proportion of participants being from the relatively low adherence group (76%) as compared to the other group (64%). Most participants also said they often

felt frustrated due to the strict schedule for the injections, with a slightly higher proportion being from the relatively low adherence group (79%) as compared to the other group (76%).

***Table 16: The Barriers to insulin use of the participants having Relatively high and low insulin adherence(N=150)***

| | | *Insulin adherence* | | |
|---|---|---|---|---|
| **Characteristic** | **Overall**, N = 150[1] | **Relatively high adherence**, N = 121[1] | **Relatively low adherence**, N = 29[1] | **p-value**[2] |
| **Perceived degree of pain during injection** | | | | 0.3 |
| Mild Discomfort | 42 (28%) | 36 (30%) | 6 (21%) | |
| Discomfort | 64 (43%) | 53 (44%) | 11 (38%) | |
| Painful | 44 (29%) | 32 (26%) | 12 (41%) | |
| **Bleeding from injection site** | | | | **0.007** |
| Never | 83 (55%) | 73 (60%) | 10 (34%) | |
| Sometimes | 7 (4.7%) | 3 (2.5%) | 4 (14%) | |
| Rarely | 60 (40%) | 45 (37%) | 15 (52%) | |
| **Hypoglycemia symptoms** | | | | 0.2 |
| Often | 2 (1.3%) | 2 (1.7%) | 0 (0%) | |
| Sometimes | 4 (2.7%) | 2 (1.7%) | 2 (6.9%) | |
| Rarely | 144 (96%) | 117 (97%) | 27 (93%) | |

[1] n (%)

[2] Pearson's Chi-squared test; Fisher's exact test

Table 16 also shows the barriers for insulin use of the participants who had relatively high and low insulin adherence. Most participants said they felt discomfort due to insulin injection, with a slightly higher proportion of participants being from the relatively high adherence group (44%) as compared to the other group (38%). Most participants said they never had any bleeding from the injection site, with a higher proportion being from the relatively high adherence group (60%) as compared to the other group (34%). Also, most of the participants said they rarely experienced hypoglycemia symptoms, with a slightly higher proportion being from relatively high adherence group (97%) as compared to the other group.

***Table 17: The Perceived satisfaction with treatment & health of the participants having Relatively high and low Insulin adherence(N=150)***

| | *Insulin adherence* | | | |
|---|---|---|---|---|
| **Characteristic** | **Overall**, N = 150[1] | **Relatively high adherence**, N = 121[1] | **Relatively low adherence**, N = 29[1] | **p-value**[2] |
| **Perceived improvement in condition** | | | | 0.081 |
| Better | 3 (2.0%) | 1 (0.8%) | 2 (6.9%) | |
| Same | 63 (42%) | 49 (40%) | 14 (48%) | |
| Worse | 84 (56%) | 71 (59%) | 13 (45%) | |
| **Perceived health** | | | | 0.14 |
| Healthy | 57 (38%) | 50 (41%) | 7 (24%) | |
| Uncertain | 12 (8.0%) | 8 (6.6%) | 4 (14%) | |
| Unhealthy | 81 (54%) | 63 (52%) | 18 (62%) | |
| **Satisfaction with insulin** | | | | **0.005** |
| Dissatisfied | 11 (7.3%) | 6 (5.0%) | 5 (17%) | |
| Uncertain | 15 (10%) | 9 (7.4%) | 6 (21%) | |

*Insulin adherence*

| Characteristic | **Overall**, N = 150[1] | **Relatively high adherence**, N = 121[1] | **Relatively low adherence**, N = 29[1] | **p-value**[2] |
|---|---|---|---|---|
| Satisfied | 124 (83%) | 106 (88%) | 18 (62%) | |

[1] n (%), [2] Fisher's exact test

Table 17 also shows the perceived satisfaction & health for insulin using participants who had relatively high and low adherence. Most participants said their condition felt worse after starting insulin, with a higher proportion (59%) from relatively high adherence group as compared to the other group (45%). Most participants perceived themselves to be unhealthy, with a higher proportion (62%) from relatively low adherence group as compared to the other group (52%). Also, most participants said that they are satisfied with their insulin therapy, with a higher proportion (88%) from relatively high adherence group as compared to the other group (62%).

**Questionnaire to assess self-maintenance**

The questionnaire used to assess self-maintenance had 8 questions, each of which, when correct, was given a maximum score of 2. For diet & substance use questions, healthy diet & absence of substance use were given a score of 2. Otherwise, they were given 0. Came up to a total of 16 marks.

Participants who scored >8 out of a total score of 16, were considered to have **relatively high self-maintenance**, and <8 were considered to have **relatively low self-maintenance**. The mean (SD) self-maintenance score of all the participants was 8.83 (2.19).

| **Questions used to assess self-maintenance** | **(N = 150)** **n (%)** |
|---|---|
| Q1. Frequency of consuming fruits/vegetables in a week | |
| < 4 days/week | 50 (33%) |
| ≥ 4 days/week | 100 (67%) |
| Q2. Current tobacco consumption | 34 (23%) |
| Q3. Current alcohol consumption | 28 (19%) |
| Q4. Conscious effort to quit alcohol or tobacco in the past 12 months | 6 (4.0%) |

**(N = 150)**

**Questions used to assess self-maintenance** **n (%)**

Q5. I tend to avoid seeing the doctor (diabetes specialist) regarding my diabetes. (avoid_doctor's_visit)

Q6. Occasionally, I eat lots of sweets or other foods that are rich in carbohydrates. (eat_sweets)

Q7. I check my blood glucose levels frequently enough to achieve good glucose control. (check_rbs_regularly)

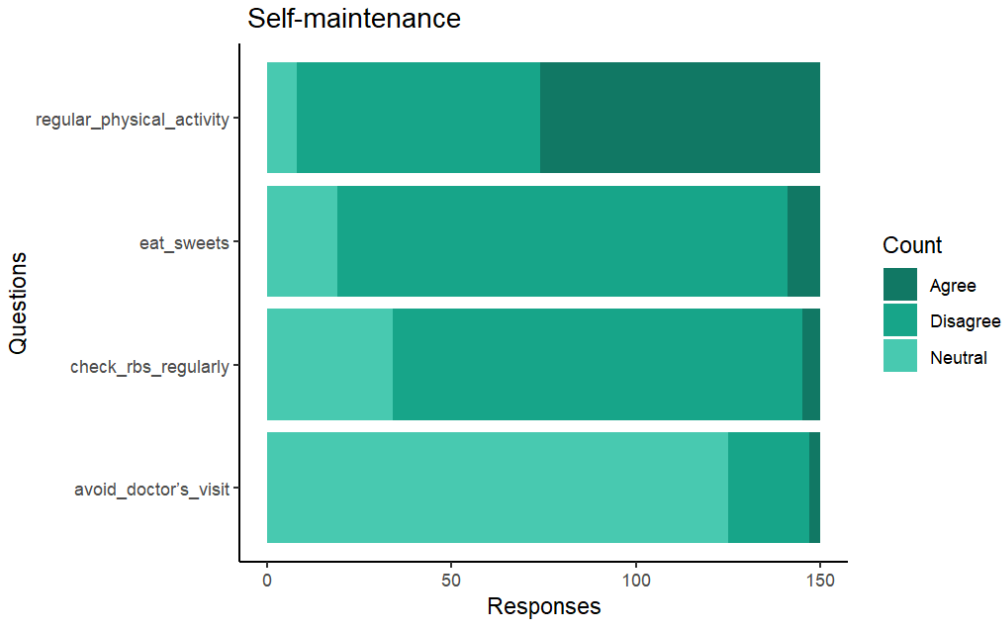
Q8. I am regularly physically active to improve my diabetes/my health. (regular_physical_activity)

***Table 18: Distribution of responses among participants for each self-maintenance(N=150)***

| | avoid_doctor's_visit | eat_sweets | check_rbs_regularly | regular_physical_act |
|---|---|---|---|---|
| Agree | 3 (2%) | 9 (6%) | 5 (3%) | 76 (51%) |
| Neutral | 125 (83%) | 19 (14%) | 34 (23%) | 8 (5%) |
| Disagree | 22 (15%) | 122 (80%) | 111 (74%) | 66 (44%) |

Table 18 shows the number of participants who picked each response for each question.

***Figure 8: Distribution of each response by participants to questions related to self-maintenance***



The above bar chart depicts the number of participants who selected each response to the different questions used to assess self-maintenance.

***Table 19: The Perceived acceptance of treatment of the participants having Relatively high and low self-maintenance(N=150)***

| | | *Self-maintenance* | | |
|---|---|---|---|---|
| **Characteristic** | **Overall**, N = 150[1] | **Relatively high self-maintenance**, N = 90[1] | **Relatively low self-maintenance**, N = 60[1] | **p-value**[2] |
| **Dependency on insulin** | | | | 0.12 |
| Agree | 116 (77%) | 73 (81%) | 43 (72%) | |
| Uncertain | 32 (21%) | 17 (19%) | 15 (25%) | |
| Disagree | 2 (1.3%) | 0 (0%) | 2 (3.3%) | |
| **Concern regarding insulin side effects** | | | | **0.019** |
| Agree | 8 (5.3%) | 7 (7.8%) | 1 (1.7%) | |
| Uncertain | 27 (18%) | 21 (23%) | 6 (10%) | |
| Disagree | 115 (77%) | 62 (69%) | 53 (88%) | |

[1] n (%)

[2] Fisher's exact test

Table 19 shows the perceived acceptance of insulin use of the participants who had relatively high and low self-maintenance. Most participants agreed to be dependent on insulin use, with a higher proportion of participants agreeing from the relatively high self-maintenance group (81%) as compared to the other group (72%). Most participants disagreed to be concerned regarding insulin side-effects, with a higher proportion (88%) from the relatively low self-maintenance group disagreeing as compared to the other group (69%).

***Table 20: The Perceived acceptance of treatment of the participants having Relatively high and low self-maintenance(N=150)***

| | | *Self-maintenance* | | |
|---|---|---|---|---|
| **Characteristic** | **Overall**, N = 150[1] | **Relatively high self-maintenance**, N = 90[1] | **Relatively low self-maintenance**, N = 60[1] | **p-value**[2] |
| **Disruption of daily activity by Insulin** | | | | 0.7 |
| Agree | 53 (35%) | 34 (38%) | 19 (32%) | |
| Uncertain | 8 (5.3%) | 4 (4.4%) | 4 (6.7%) | |
| Disagree | 89 (59%) | 52 (58%) | 37 (62%) | |
| **Perceived harm by insulin use** | | | | 0.2 |
| Agree | 6 (4.0%) | 2 (2.2%) | 4 (6.7%) | |
| Uncertain | 12 (8.0%) | 5 (5.6%) | 7 (12%) | |
| Disagree | 132 (88%) | 83 (92%) | 49 (82%) | |
| **Necessity for starting insulin** | | | | 0.088 |
| Agree | 125 (83%) | 79 (88%) | 46 (77%) | |
| Uncertain | 24 (16%) | 11 (12%) | 13 (22%) | |
| Disagree | 1 (0.7%) | 0 (0%) | 1 (1.7%) | |

[1] n (%)

[2] Fisher's exact test

Table 20 also shows the perceived acceptance of insulin use of the participants who had relatively high and low self-maintenance. Most participants disagreed that insulin use disrupted their daily activity, with a slightly higher proportion of participants being from

the relatively low self-maintenance group (62%) as compared to the other group (58%). Most participants disagreed that insulin caused more harm than good, with a higher proportion (92%) from the relatively high self-maintenance group disagreeing as compared to the other group (82%). Also most of the participants agreed that it was necessary for them to start insulin, with a higher proportion (88%) being from relatively high group as compared to low (77%).

***Table 21: The Perceived readiness to treatment of the participants having Relatively high and low self-maintenance(N=150)***

| | | *Self-maintenance* | | |
|---|---|---|---|---|
| **Characteristic** | **Overall**, N = 150[1] | **Relatively high self-maintenance**, N = 90[1] | **Relatively low self-maintenance**, N = 60[1] | **p-value**[2] |
| **Perceived severity of the condition** | | | | 0.6 |
| Mild | 35 (23%) | 19 (21%) | 16 (27%) | |
| Uncertain | 43 (29%) | 28 (31%) | 15 (25%) | |
| Severe | 72 (48%) | 43 (48%) | 29 (48%) | |
| **Perceived anxiety due to diabetes** | | | | 0.071 |
| Often | 7 (4.7%) | 4 (4.4%) | 3 (5.0%) | |
| Sometimes | 43 (29%) | 32 (36%) | 11 (18%) | |
| Rarely | 100 (67%) | 54 (60%) | 46 (77%) | |

[1] n (%)

[2] Pearson's Chi-squared test; Fisher's exact test

Table 21 shows the perceived readiness to start insulin for the participants who had relatively high and low self-maintenance. Most participants considered their condition to be severe, with equal proportion in both the groups. Most participants rarely felt anxious due to their condition, with a higher proportion (77%) from the relatively low self-maintenance group as compared to the other group (60%).

***Table 22: The Perceived readiness to treatment of the participants having Relatively high and low self-maintenance(N=150)***

| | | *Self-maintenance* | | |
|---|---|---|---|---|
| **Characteristic** | **Overall**, N = 150[1] | **Relatively high self-maintenance**, N = 90[1] | **Relatively low self-maintenance**, N = 60[1] | **p-value**[2] |
| **Pressure from friends/family to visit the doctor** | | | | 0.079 |
| Often | 25 (17%) | 20 (22%) | 5 (8.3%) | |
| Sometimes | 108 (72%) | 60 (67%) | 48 (80%) | |
| Rarely | 17 (11%) | 10 (11%) | 7 (12%) | |
| **Condition as compared to peers** | | | | 0.4 |
| Better | 2 (1.3%) | 1 (1.1%) | 1 (1.7%) | |
| Same | 71 (47%) | 39 (43%) | 32 (53%) | |
| Worse | 77 (51%) | 50 (56%) | 27 (45%) | |
| **Skepticism in modern medicine** | 38 (25%) | 22 (24%) | 16 (27%) | 0.8 |

[1] n (%)

[2] Fisher's exact test

Table 22 also shows the perceived readiness to start insulin for the participants who had relatively high and low self-maintenance. Most participants said they sometimes had pressure from their friend's/family to visit the doctor, with a higher proportion (80%) being from the relatively low group as compared to the high group (67%). Most participants felt that their condition was worse as compared to their peers, with a higher proportion (56%) from the relatively high self-maintenance group as compared to the other group (45%). 1/4$^{th}$ the participants had skepticism in modern medicine, with a higher proportion from low self-maintenance group (27%) as compared to high(24%).

***Table 23: The Facilitators to insulin use of the participants having Relatively high and low self-maintenance(N=150)***

| Characteristic | Overall, N = 150[1] | *Self-maintenance* Relatively high self-maintenance, N = 90[1] | Relatively low self-maintenance, N = 60[1] | p-value[2] |
|---|---|---|---|---|
| **Health insurance coverage** | 24 (16%) | 12 (13%) | 12 (20%) | 0.3 |
| **Family help for insulin use** | 31 (21%) | 21 (23%) | 10 (17%) | 0.3 |
| **Injection instructor** | | | | **0.002** |
| Diabetes Specialist | 73 (49%) | 53 (59%) | 20 (33%) | |
| General Practitioner | 77 (51%) | 37 (41%) | 40 (67%) | |
| **Latest injection instruction** | | | | >0.9 |
| <6 months | 141 (94%) | 85 (94%) | 56 (93%) | |
| >6 months | 9 (6.0%) | 5 (5.6%) | 4 (6.7%) | |
| **Insulin source** | | | | 0.14 |
| Nearby medical store | 61 (41%) | 41 (46%) | 20 (33%) | |
| Treating hospital | 89 (59%) | 49 (54%) | 40 (67%) | |

[1] n (%)

[2] Pearson's Chi-squared test; Fisher's exact test

Table 23 shows the facilitators of insulin use for the participants who had relatively high and low self-maintenance. Less than 1/4$^{th}$ the participants said that they had insurance coverage, with a higher proportion from the relatively low self-maintenance group (20%) as compared to the other group (13%). Less than 1/4$^{th}$ participants said that they received any kind of help from their family in taking insulin, with a higher proportion (23%) being from the relatively high self-maintenance group as compared to the other group (17%). A higher proportion (59%) of participants belonging to the relatively high self-maintenance group said to have received their injection training from a diabetic specialist as compared

to the other group (33%). A majority of the participants got a review of the injection instruction in < 6 months, almost equal proportions from both groups. Most of the participants got their insulin from their treating hospitals, with a higher proportion (67%) being from the relatively low self-maintenance group as compared to the other group (54%).

***Table 24: The Barriers to insulin use of the participants having Relatively high and low self-maintenance(N=150)***

| | | *Self-maintenance* | | |
|---|---|---|---|---|
| **Characteristic** | **Overall**, N = 150[1] | **Relatively high self-maintenance**, N = 90[1] | **Relatively low self-maintenance**, N = 60[1] | **p-value**[2] |
| **Feeling embarrassed due to insulin** | | | | **0.001** |
| Often | 99 (66%) | 49 (54%) | 50 (83%) | |
| Sometimes | 25 (17%) | 21 (23%) | 4 (6.7%) | |
| Rarely | 26 (17%) | 20 (22%) | 6 (10%) | |
| **Feeling frustrated due to strict schedule** | | | | 0.9 |
| Often | 115 (77%) | 70 (78%) | 45 (75%) | |
| Sometimes | 30 (20%) | 17 (19%) | 13 (22%) | |
| Rarely | 5 (3.3%) | 3 (3.3%) | 2 (3.3%) | |

[1] n (%)

[2] Fisher's exact test

Table 24 shows the barriers for insulin use of the participants who had relatively high and low self-maintenance. Most participants said they often felt embarrassed due to insulin injection, with a higher proportion of participants being from the relatively low self-maintenance group (83%) as compared to the other group (54%). Most participants also said they often felt frustrated due to the strict schedule for the injections, with almost equal proportion in both groups.

***Table 25: The Barriers to insulin use of the participants having Relatively high and low self-maintenance(N=150)***

| | | *Self-maintenance* | | |
|---|---|---|---|---|
| **Characteristic** | **Overall**, N = 150[1] | **Relatively high self-maintenance**, N = 90[1] | **Relatively low self-maintenance**, N = 60[1] | **p-value**[2] |
| **Perceived degree of pain during injection** | | | | >0.9 |
| Painful | 42 (28%) | 25 (28%) | 17 (28%) | |
| Discomfort | 64 (43%) | 38 (42%) | 26 (43%) | |
| Mild Discomfort | 44 (29%) | 27 (30%) | 17 (28%) | |
| **Bleeding from the injection site** | | | | 0.7 |
| Never | 83 (55%) | 51 (57%) | 32 (53%) | |
| Rarely | 7 (4.7%) | 5 (5.6%) | 2 (3.3%) | |
| Sometimes | 60 (40%) | 34 (38%) | 26 (43%) | |
| **Hypoglycemia symptoms** | | | | 0.11 |
| Often | 2 (1.3%) | 2 (2.2%) | 0 (0%) | |
| Sometimes | 4 (2.7%) | 4 (4.4%) | 0 (0%) | |
| Rarely | 144 (96%) | 84 (93%) | 60 (100%) | |

[1] n (%)

[2] Pearson's Chi-squared test; Fisher's exact test

Table 25 also shows the barriers to insulin use of the participants who had relatively high and low self-maintenance. Most participants felt discomfort due to insulin injection, with equal proportions in each group. Most participants also said they never bled from the

injection site, with equal proportions in both groups. Most participants also rearely hd hypoglycemia symptoms.

***Table 26: The Perceived satisfaction with treatment & health of the participants having Relatively high and low self-maintenance(N=150)***

| | *Self-maintenance* | | | |
|---|---|---|---|---|
| **Characteristic** | **Overall**, N = 150[1] | **Relatively high self-maintenance**, N = 90[1] | **Relatively low self-maintenance**, N = 60[1] | **p-value**[2] |
| **Perceived improvement in condition** | | | | 0.056 |
| Better | 3 (2.0%) | 2 (2.2%) | 1 (1.7%) | |
| Same | 63 (42%) | 31 (34%) | 32 (53%) | |
| Worse | 84 (56%) | 57 (63%) | 27 (45%) | |
| **Perceived health** | | | | 0.8 |
| Healthy | 57 (38%) | 35 (39%) | 22 (37%) | |
| Uncertain | 12 (8.0%) | 8 (8.9%) | 4 (6.7%) | |
| Unhealthy | 81 (54%) | 47 (52%) | 34 (57%) | |
| **Satisfaction with insulin** | | | | >0.9 |
| Dissatisfied | 11 (7.3%) | 6 (6.7%) | 5 (8.3%) | |
| Uncertain | 15 (10%) | 9 (10%) | 6 (10%) | |
| Satisfied | 124 (83%) | 75 (83%) | 49 (82%) | |

[1] n (%), [2] Fisher's exact test

Table 26 also shows the barriers for insulin use of the participants who had relatively high and low self-maintenance. Most participants said their condition felt worse after starting insulin, with a higher proportion (63%) from relatively high self-maintenance group as

compared to the other group (45%). Most participants perceived themselves to be unhealthy, with a higher proportion (62%) from relatively low self-maintenance group as compared to the other group (52%). Also most participants said that they are satisfied with their insulin therapy, with almost equal proportions in each groups.

**Glycemic control**

Two parameters determined the control status and nomenclature of participants simultaneously to consider the qualifying status of the patient.

1. Subsequent consecutive HbA1c difference values (Net) - we took an absolute difference between the two subsequent HbA1c values. (If the difference of two subsequent HbA1c is positive then the net result is negative and if the difference of two subsequent HbA1c is negative then the net result is positive)
2. Average HbA1c value - A simple arithmetic mean for HbA1c values were made.

The working definition of various traits was calculated as follows:

**Low persisters:** The average HbA1c level is less than 8

**High persisters:** The average HbA1c level is greater than 10

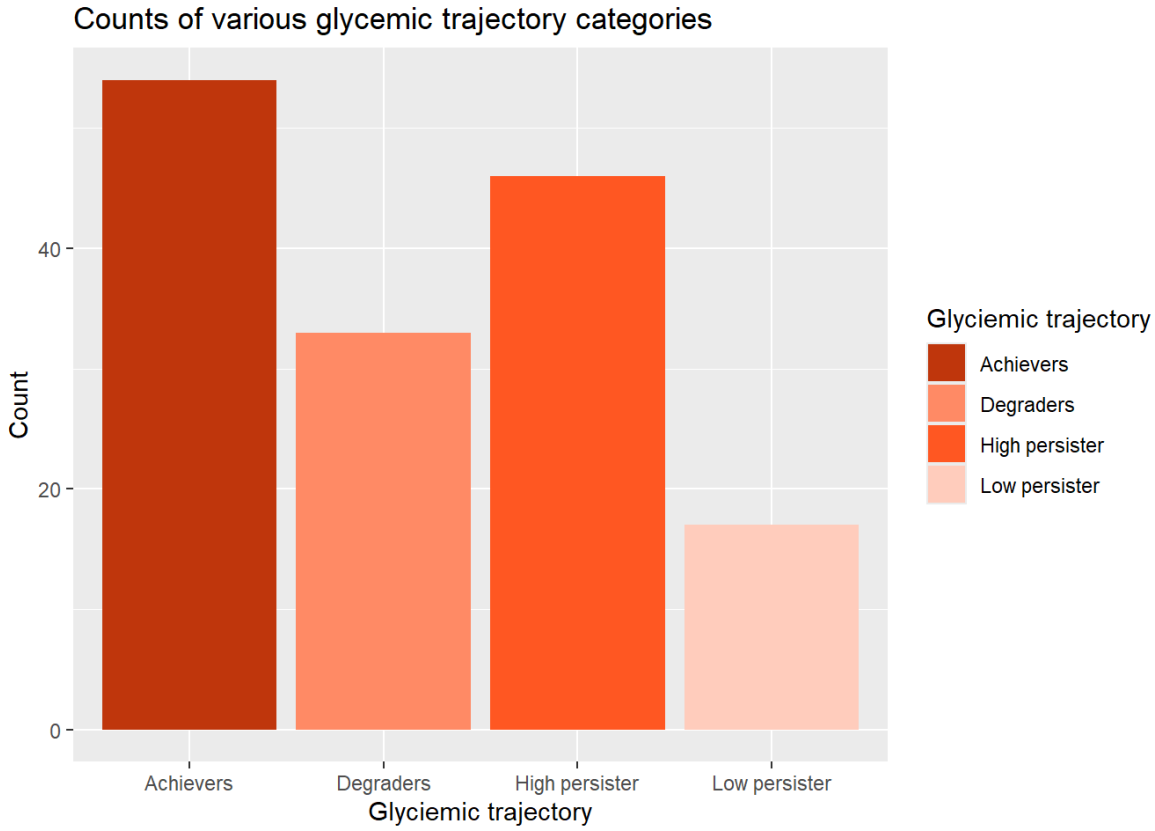
**Achievers:** If the average HbA1c level is less than 10, greater than 8, the net change is positive.

**Degraders:** If the average HbA1c level is less than 10 or greater than 8, the net change is negative.

The high persisters & degraders were clubbed together and considered a **bad glycemic control** group.

The low persisters and achievers were considered as **good glycemic control** group.

***Figure 9: Number of participants in various glycemic trajectory groups.***




The above bar chart depicts the number of participants present in the different glycemic trajectory groups.

***Table 27: The age categories and sex of the participants having Good and Bad glycemic control(N=150)***

| | | *Glycemic control* | | |
|---|---|---|---|---|
| **Characteristic** | **Overall**, N = 150[1] | **Bad glycemic control**, N = 79[1] | **Good glycemic control**, N = 71[1] | **p-value**[2] |
| **Age category** | | | | 0.4 |
| <45 | 16 (11%) | 7 (8.9%) | 9 (13%) | |
| 45-60 | 51 (34%) | 24 (30%) | 27 (38%) | |
| >60 | 83 (55%) | 48 (61%) | 35 (49%) | |
| **Sex** | | | | 0.7 |
| Female | 76 (51%) | 39 (49%) | 37 (52%) | |
| Male | 74 (49%) | 40 (51%) | 34 (48%) | |

[1] n (%)

[2] Pearson's Chi-squared test

Table 27 shows the age categories and sex of the participants who had good and bad glycemic control. Most participants belong to the >60 years category, with a higher proportion (61%) in the bad glycemic control group as compared to the good (49%). Almost equal distribution of males and females are there across both the groups.

***Table 28: The education and monthly income of the participants having Good and Bad glycemic control(N=150)***

| | | *Glycemic control* | |
|---|---|---|---|
| **Characteristic** | **Overall**, N = 150[1] | **Bad glycemic control**, N = 79[1] | **Good glycemic control**, N = 71[1] | **p-value**[2] |
| **Education** | | | | 0.6 |
| Graduate & above | 39 (26%) | 21 (27%) | 18 (25%) | |
| Upto intermediate | 64 (43%) | 31 (39%) | 33 (46%) | |
| Upto Primary | 47 (31%) | 27 (34%) | 20 (28%) | |
| **Monthly income** | | | | 0.5 |
| < 10,000 Rs | 74 (49%) | 42 (53%) | 32 (45%) | |
| 10,000 - 50,000 Rs | 46 (31%) | 21 (27%) | 25 (35%) | |
| >50,000 Rs | 30 (20%) | 16 (20%) | 14 (20%) | |

[1] n (%)

[2] Pearson's Chi-squared test

Table 28 shows the education and monthly income of the participants who had good and bad glycemic control. Most participants were educated upto intermediate level, with a higher proportion (46%) in the good glycemic control group than the bad (39%). Most participants had a monthly income < 10,000 Rs, with a higher proportion (53%) in bad glycemic control group compared to good (45%).

***Table 29: The disease-related characteristics of the participants having Good and Bad glycemic control(N=150)***

| | | *Glycemic control* | | |
|---|---|---|---|---|
| **Characteristic** | **Overall**, N = 150[1] | **Bad glycemic control**, N = 79[1] | **Good glycemic control**, N = 71[1] | **p-value**[2] |
| **Family history of diabetes** | 72 (48%) | 41 (52%) | 31 (44%) | 0.3 |
| **Duration of diabetes (years)** | 12 (7) | 12 (7) | 11 (6) | 0.3 |
| **Duration of insulin use (years)** | 2.66 (2.92) | 2.98 (3.09) | 2.30 (2.69) | 0.2 |
| **Number of comorbidities** | | | | 0.4 |
| ≥2 | 26 (17%) | 17 (22%) | 9 (13%) | |
| 1 | 72 (48%) | 36 (46%) | 36 (51%) | |
| None | 52 (35%) | 26 (33%) | 26 (37%) | |
| **On HTN medication** | 85 (57%) | 38 (48%) | 47 (66%) | **0.026** |

[1] n (%); Mean (SD)

[2] Pearson's Chi-squared test; Wilcoxon rank sum test

Table 29 shows the disease-related characteristics of the participants who had good and bad glycemic control. A higher proportion in bad glycemic control group (52%) had a family history of diabetes. They also had a higher mean duration of diabetes (7 years) and mean duration of insulin use (2.98 years) compared to good glycemic control group. Most participants had one comorbidity with almost equal proportions in both groups. A higher proportion (66%) of participants in the good glycemic control group were already on anti-hypertensive medications.

***Table 30: The information of injection-related variables of the participants having Good and Bad glycemic control(N=150)***

| | | *Glycemic control* | | |
|---|---|---|---|---|
| **Characteristic** | **Overall**, N = 150[1] | **Bad glycemic control**, N = 79[1] | **Good glycemic control**, N = 71[1] | **p-value**[2] |
| **Injection device** | | | | **0.005** |
| Pen | 106 (71%) | 48 (61%) | 58 (82%) | |
| Syringe | 44 (29%) | 31 (39%) | 13 (18%) | |
| **Type Insulin being used** | | | | 0.6 |
| Lantus alone | 61 (41%) | 30 (38%) | 31 (44%) | |
| Mixtard | 66 (44%) | 35 (44%) | 31 (44%) | |
| Regular + Lantus | 23 (15%) | 14 (18%) | 9 (13%) | |
| **Injection instructor** | | | | **0.035** |
| Diabetes Specialist | 73 (49%) | 32 (41%) | 41 (58%) | |
| General Practitioner | 77 (51%) | 47 (59%) | 30 (42%) | |

[1] n (%)

[2] Pearson's Chi-squared test

Table 30 shows the information of injection-related variables of the participants who had good and bad glycemic control. Most participants used a pen as their injection device, with a higher proportion (82%) in the good glycemic control group than the bad (61%). Most participants from both groups used either lantus alone or mixtard. A higher proportion of participants in the good glycemic control group had a diabetic specialist (58%) as their injection instructor as compared to bad control group (41%).

***Table 31: The HTN control status and BMI category of the participants having Good and Bad glycemic control(N=150)***

| | | *Glycemic control* | | |
|---|---|---|---|---|
| **Characteristic** | **Overall**, N = 150[1] | **Bad glycemic control**, N = 79[1] | **Good glycemic control**, N = 71[1] | **p-value**[2] |
| **HTN control status** | | | | 0.5 |
| Controlled | 30 (35%) | 12 (32%) | 18 (38%) | |
| Uncontrolled | 55 (65%) | 26 (68%) | 29 (62%) | |
| Non-hypretensive | 65 | 41 | 24 | |
| **BMI category** | | | | **0.040** |
| Normal | 44 (29%) | 30 (38%) | 14 (20%) | |
| Overweight | 62 (41%) | 27 (34%) | 35 (49%) | |
| Obese | 44 (29%) | 22 (28%) | 22 (31%) | |

[1] n (%)

[2] Pearson's Chi-squared test

Table 31 shows the hypertension control status and BMI category of the participants who had good and bad glycemic control. Most participants had uncontrolled hypertension, with a higher proportion (68%) in the bad glycemic control group than the good (62%). Most participants belonged to the overweight BMI category, with a higher proportion in good glycemic control group (49%) compared to the bad (34%).

***Table 32: The serum creatinine & LDL levels of the participants having Good and Bad glycemic control(N=150)***

| | | *Glycemic control* | | |
|---|---|---|---|---|
| **Characteristic** | **Overall**, N = 150[1] | **Bad glycemic control**, N = 79[1] | **Good glycemic control**, N = 71[1] | **p-value**[2] |
| **Creatinine levels** | | | | 0.3 |
| >1.2 mg/dL | 24 (18%) | 15 (21%) | 9 (15%) | |
| <1.2 mg/dL | 108 (82%) | 56 (79%) | 52 (85%) | |
| Missing | 18 | 8 | 10 | |
| **Dyslipidemia** | | | | 0.4 |
| (LDL) >100 mg/dL | 30 (25%) | 18 (28%) | 12 (21%) | |
| (LDL) <100 mg/dL | 90 (75%) | 46 (72%) | 44 (79%) | |
| Missing | 30 | 15 | 15 | |

[1] n (%)

[2] Pearson's Chi-squared test

Table 32 shows the serum creatinine & LDL levels of the participants who had good and bad glycemic control. Most participants had creatinine levels <1.2 mg/dL, with a higher proportion (85%) in the good glycemic control group than the bad (79%). Most participants had LDL levels <100 mg/dL, with a higher proportion in good glycemic control group (79%) compared to the bad (72%).

***Table 33: The information on insulin adherence of the participants having Good and Bad glycemic control(N=150)***

| | | *Glycemic control* | | |
|---|---|---|---|---|
| **Item characteristic** | **Overall**, N = 150[1] | **Bad glycemic control**, N = 79[1] | **Good glycemic control**, N = 71[1] | **p-value**[2] |
| **Forgot to take insulin in the past 4 weeks** | | | | **<0.001** |
| Often | 3 (2.0%) | 3 (3.8%) | 0 (0%) | |
| Sometimes | 50 (33%) | 35 (44%) | 15 (21%) | |
| Rarely | 97 (65%) | 41 (52%) | 56 (79%) | |
| **Decided not to take insulin in the past 4 weeks** | | | | 0.2 |
| Often | 3 (2.0%) | 3 (3.8%) | 0 (0%) | |
| Sometimes | 7 (4.7%) | 5 (6.3%) | 2 (2.8%) | |
| Rarely | 140 (93%) | 71 (90%) | 69 (97%) | |
| **Refilling insulin in the past 4 weeks before running out** | | | | 0.6 |
| Often | 93 (62%) | 46 (58%) | 47 (66%) | |
| Sometimes | 49 (33%) | 28 (35%) | 21 (30%) | |
| Rarely | 8 (5.3%) | 5 (6.3%) | 3 (4.2%) | |

[1] n (%)

[2] Fisher's exact test; Pearson's Chi-squared test

Table 33 shows the information on insulin adherence of the participants who had good and bad glycemic control. Most participants rarely forgot to take insulin, with a higher proportion (79%) in the good glycemic control group than the bad (52%). Most participants rarely deliberately chose not to take insulin, with a higher proportion in good

glycemic control group (97%) compared to the bad (90%). Also, most participants often filled insulin before running out, with a higher proportion (66%) from good glycemic control group than bad (58%).

***Table 34: The information on insulin adherence of the participants having Good and Bad glycemic control(N=150)***

| | | *Glycemic control* | | |
|---|---|---|---|---|
| **Item characteristic** | **Overall**, N = 150[1] | **Bad glycemic control**, N = 79[1] | **Good glycemic control**, N = 71[1] | **p-value**[2] |
| **Stopping insulin when I feel better** | | | | 0.4 |
| Often | 9 (6.0%) | 6 (7.6%) | 3 (4.2%) | |
| Sometimes | 19 (13%) | 12 (15%) | 7 (9.9%) | |
| Rarely | 122 (81%) | 61 (77%) | 61 (86%) | |
| **Adapting insulin doses to current blood glucose levels** | | | | 0.086 |
| Often | 5 (3.3%) | 1 (1.3%) | 4 (5.6%) | |
| Sometimes | 34 (23%) | 14 (18%) | 20 (28%) | |
| Rarely | 111 (74%) | 64 (81%) | 47 (66%) | |
| **Adjusting the timing of your insulin injection to food intake** | | | | 0.3 |
| Often | 63 (42%) | 29 (37%) | 34 (48%) | |
| Sometimes | 30 (20%) | 19 (24%) | 11 (15%) | |
| Rarely | 57 (38%) | 31 (39%) | 26 (37%) | |

[1] n (%), [2] Fisher's exact test; Pearson's Chi-squared test

Table 34 also shows the information on insulin adherence of the participants who had good and bad glycemic control. Most participants rarely rarely stopped taking their insulin when they felt better, with a higher proportion (86%) in the good glycemic control group than the bad (77%). Most participants rarely adjusted their insulin doses to RBS levels, with a higher proportion in bad glycemic control group (81%) compared to the good (66%). Also most participants often adjusted insulin timing with food intake, with a higher proportion (48%) from good glycemic control group than bad (37%).

***Table 35: The insulin adherence status of the participants having Good and Bad glycemic control(N=150)***

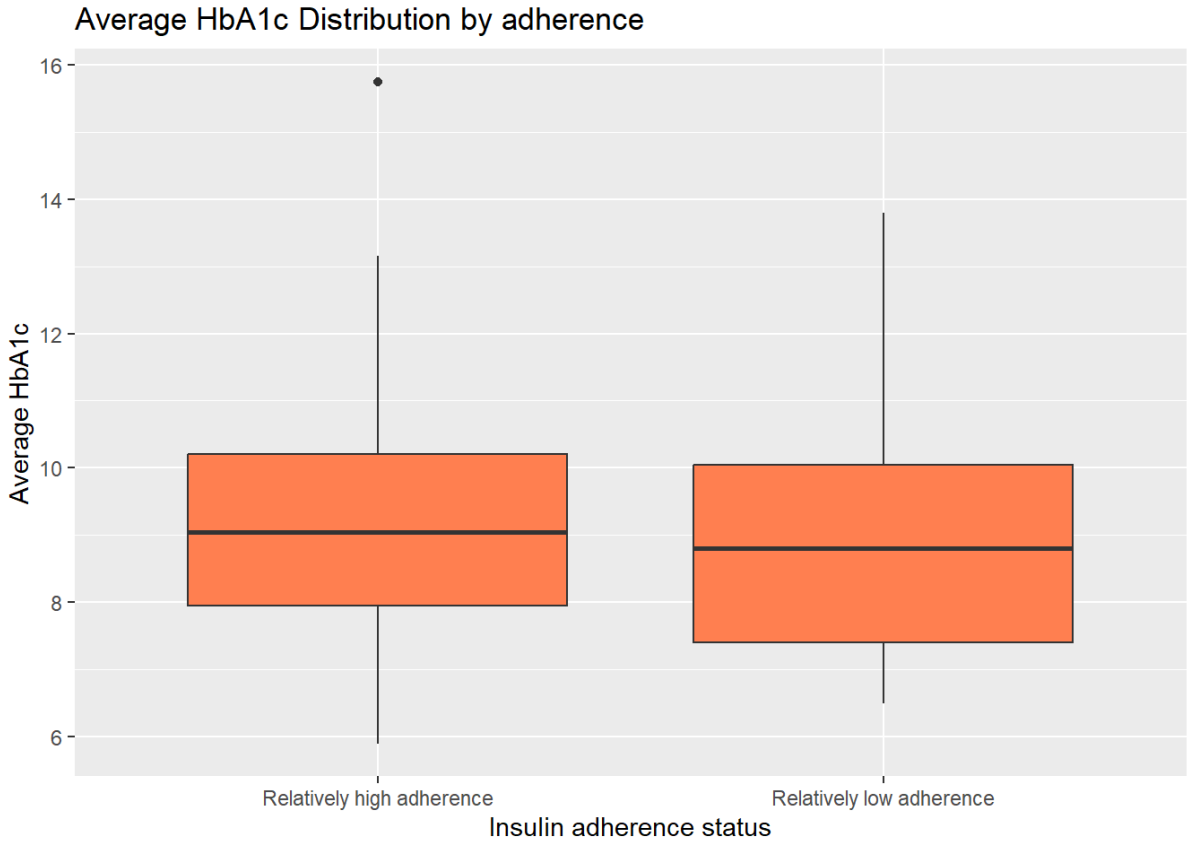
| | | *Glycemic control* | | |
|---|---|---|---|---|
| **Characteristic** | **Overall**, N = 150[1] | **Bad glycemic control**, N = 79[1] | **Good glycemic control**, N = 71[1] | **p-value**[2] |
| **Adherence status** | | | | **0.050** |
| Relatively high adherence | 121 (81%) | 59 (75%) | 62 (87%) | |
| Relatively low adherence | 29 (19%) | 20 (25%) | 9 (13%) | |

[1] n (%)

[2] Pearson's Chi-squared test

Table 35 shows insulin adherence status of the participants having Good and Bad glycemic control. A higher proportion in good glycemic control group (87%) had a relatively high adherence status as compared to bad glycemic control (75%).

***Figure 10: A box and Whisker showing the distribution of the average of the two HbA1c readings in relatively high and low insulin adherence groups***




The above figure illustrates a vertical box whisker plot with the average of the two HbA1c readings along the Y axis and the insulin adherence groups on the X axis. The median values of the average of the two HbA1c readings. The box covers the interquartile interval with lower, and the upper border of the box means the lower (25th) and upper quartiles (75th). The whiskers represent the two lines extending from the minimum value to the lower quartile and from the upper quartile to the maximum value. The black dot represents the outliers.

***Table 36: The information on healthy diet and substance use of the participants having Good and Bad glycemic control(N=150)***

| | | *Glycemic control* | | |
|---|---|---|---|---|
| **Characteristic** | **Overall**, N = 150[1] | **Bad glycemic control**, N = 79[1] | **Good glycemic control**, N = 71[1] | **p-value**[2] |
| **Frequency of consuming fruits/vegetables (≥** 4 days/week) | 100 (67%) | 51 (65%) | 49 (69%) | 0.6 |
| **Current tobacco consumption** | 34 (23%) | 19 (24%) | 15 (21%) | 0.7 |
| **Current alcohol consumption** | 28 (19%) | 21 (27%) | 7 (9.9%) | **0.009** |

[1] n (%)

[2] Pearson's Chi-squared test; Fisher's exact test

Table 36 shows the information on healthy diet and substance use of the participants having Good and Bad glycemic control. A slightly higher proportion of participants (69%) from good glycemic control group consumed fruits/vegetables more frequently than bad glycemic control group (65%). A higher proportion of participants from the bad glycemic control group, currently consumed tobacco (24%) and alcohol (27%) as compared to good glycemic control group.

***Table 37: The information on self-maintenance of the participants having Good and Bad glycemic control(N=150)***

| | | *Glycemic control* | | |
|---|---|---|---|---|
| **Item characteristic** | **Overall**, N = 150[1] | **Bad glycemic control**, N = 79[1] | **Good glycemic control**, N = 71[1] | **p-value**[2] |
| **I tend to avoid seeing the doctor (diabetes specialist) regarding my diabetes.** | | | | 0.7 |
| Agree | 3 (2.0%) | 2 (2.5%) | 1 (1.4%) | |
| Neutral | 125 (83%) | 67 (85%) | 58 (82%) | |
| Disagree | 22 (15%) | 10 (13%) | 12 (17%) | |
| **Occasionally I eat lots of sweets or other foods rich in carbohydrates.** | | | | 0.4 |
| Agree | 9 (6.0%) | 6 (7.6%) | 3 (4.2%) | |
| Neutral | 19 (13%) | 12 (15%) | 7 (9.9%) | |
| Disagree | 122 (81%) | 61 (77%) | 61 (86%) | |

[1] n (%)

[2] Pearson's Chi-squared test; Fisher's exact test

Table 37 shows the information on the self-maintenance of the participants having Good and Bad glycemic control. A higher proportion (17%) of participants in good glycemic control group disagreed to avoid seeing the doctor than the others (13%). Also, a higher proportion (86%) of participants in the good glycemic control group disagreed with eating sweets compared to the other (77%).

***Table 38: The information on self-maintenance of the participants having Good and Bad glycemic control(N=150)***

| | | *Glycemic control* | | |
|---|---|---|---|---|
| **Characteristic** | **Overall**, N = 150[1] | **Bad glycemic control**, N = 79[1] | **Good glycemic control**, N = 71[1] | **p-value**[2] |
| **I check my blood glucose levels frequently enough for achieving good glucose control.** | | | | **0.003** |
| Agree | 5 (3.3%) | 0 (0%) | 5 (7.0%) | |
| Neutral | 34 (23%) | 13 (16%) | 21 (30%) | |
| Disagree | 111 (74%) | 66 (84%) | 45 (63%) | |
| **I am regularly physically active to improve my diabetes/my health.** | | | | 0.10 |
| Agree | 76 (51%) | 37 (47%) | 39 (55%) | |
| Neutral | 8 (5.3%) | 2 (2.5%) | 6 (8.5%) | |
| Disagree | 66 (44%) | 40 (51%) | 26 (37%) | |

[1] n (%)

[2] Pearson's Chi-squared test; Fisher's exact test

Table 38 shows the information on the self-maintenance of the participants having Good and Bad glycemic control. None of the participants from bad glycemic control group agreed to check RBS regularly as compared to 7% in good glycemic control group. Also, a higher proportion (55%) in the good glycemic control group agreed to be regularly physically active than the other group (47%).

***Table 39: The self-maintenance status of the participants having Good and Bad glycemic control(N=150)***

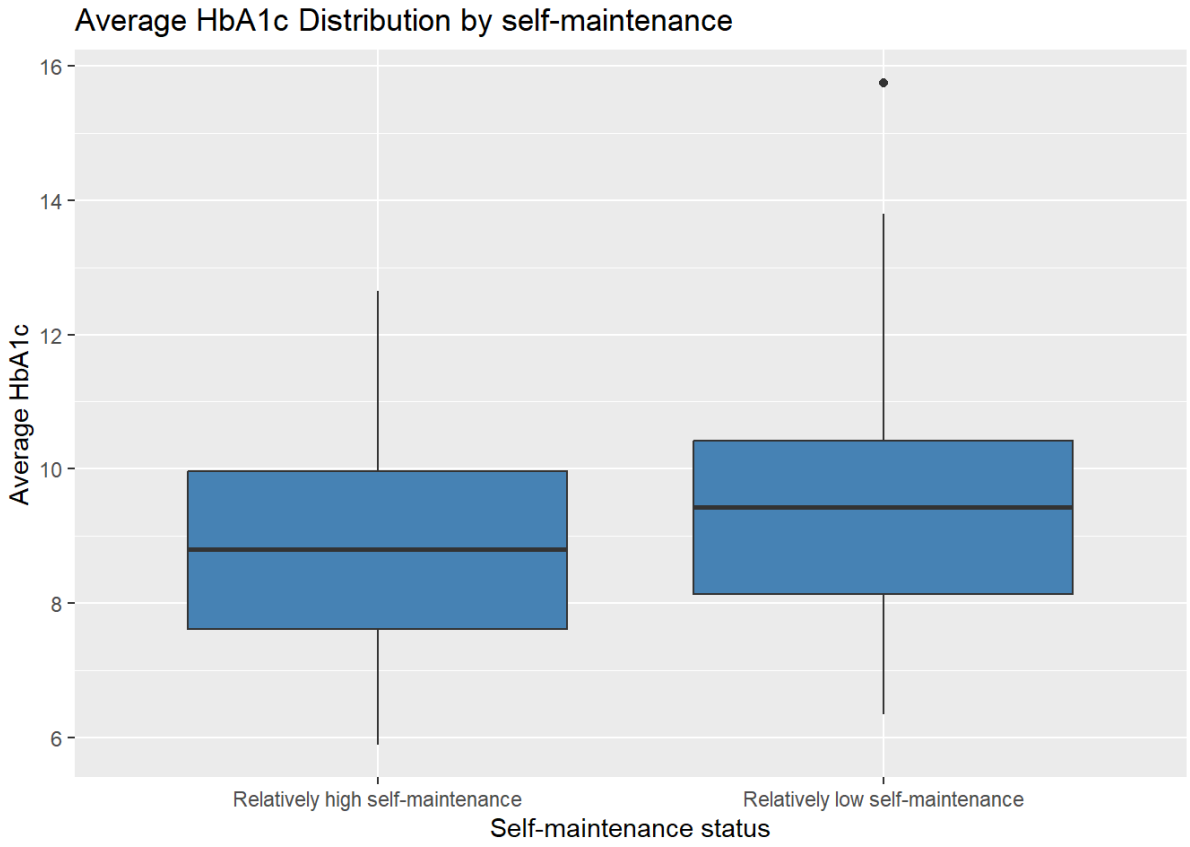
| | | *Glycemic control* | | |
|---|---|---|---|---|
| **Characteristic** | **Overall**, N = 150[1] | **Bad glycemic control**, N = 79[1] | **Good glycemic control**, N = 71[1] | **p-value**[2] |
| **Self-maintenance status** | | | | 0.071 |
| Relatively high self-maintenance | 90 (60%) | 42 (53%) | 48 (68%) | |
| Relatively low self-maintenance | 60 (40%) | 37 (47%) | 23 (32%) | |

[1] n (%)

[2] Pearson's Chi-squared test; Fisher's exact test

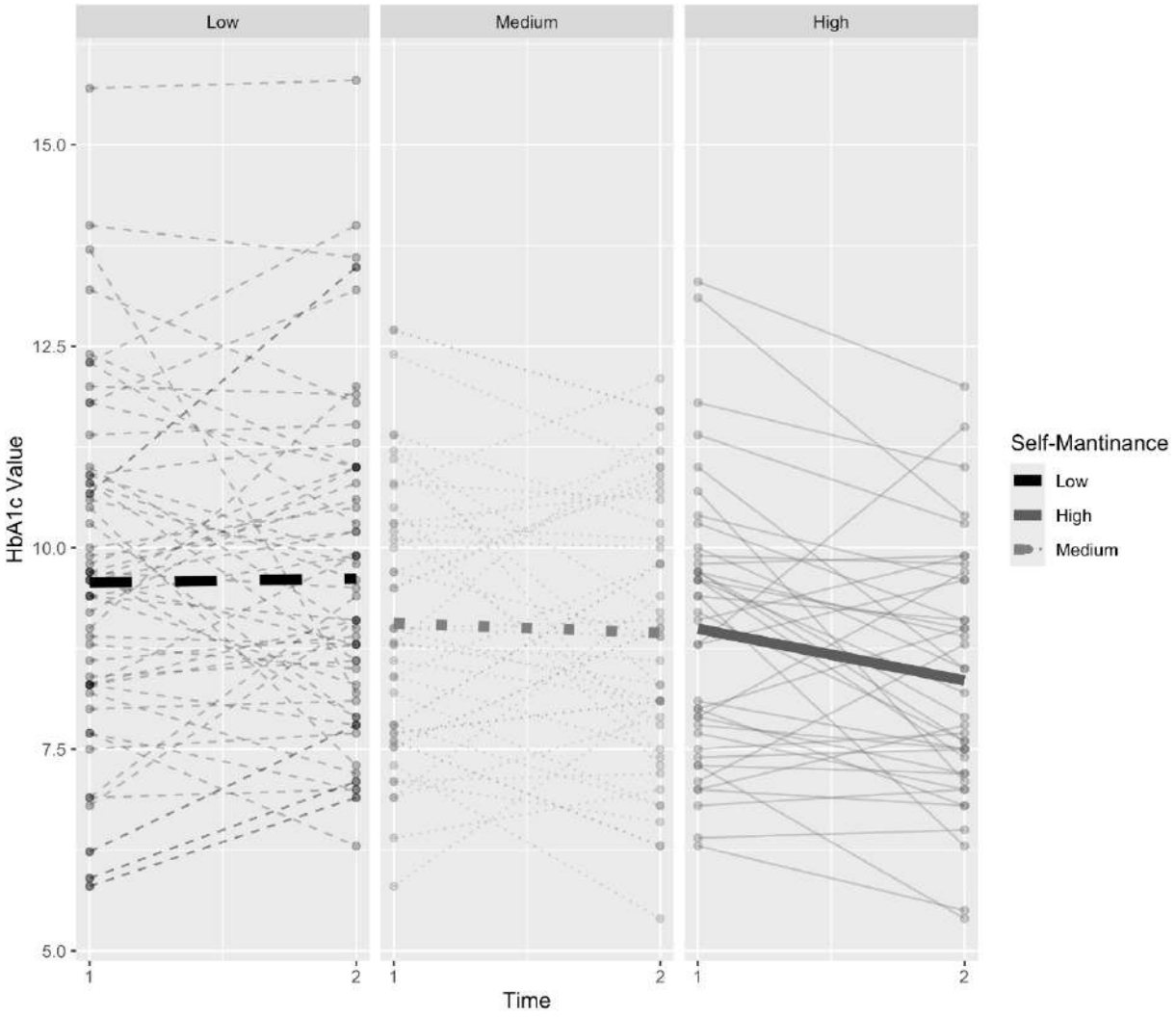
Table 39 shows the self-maintenance status of the participants having Good and Bad glycemic control. A higher proportion in good glycemic control group (68%) had a relatively high adherence status compared to bad glycemic control (53%).

***Figure 11: A box and Whisker showing the distribution of average of the two HbA1c readings in relatively high and low self-maintenance groups***



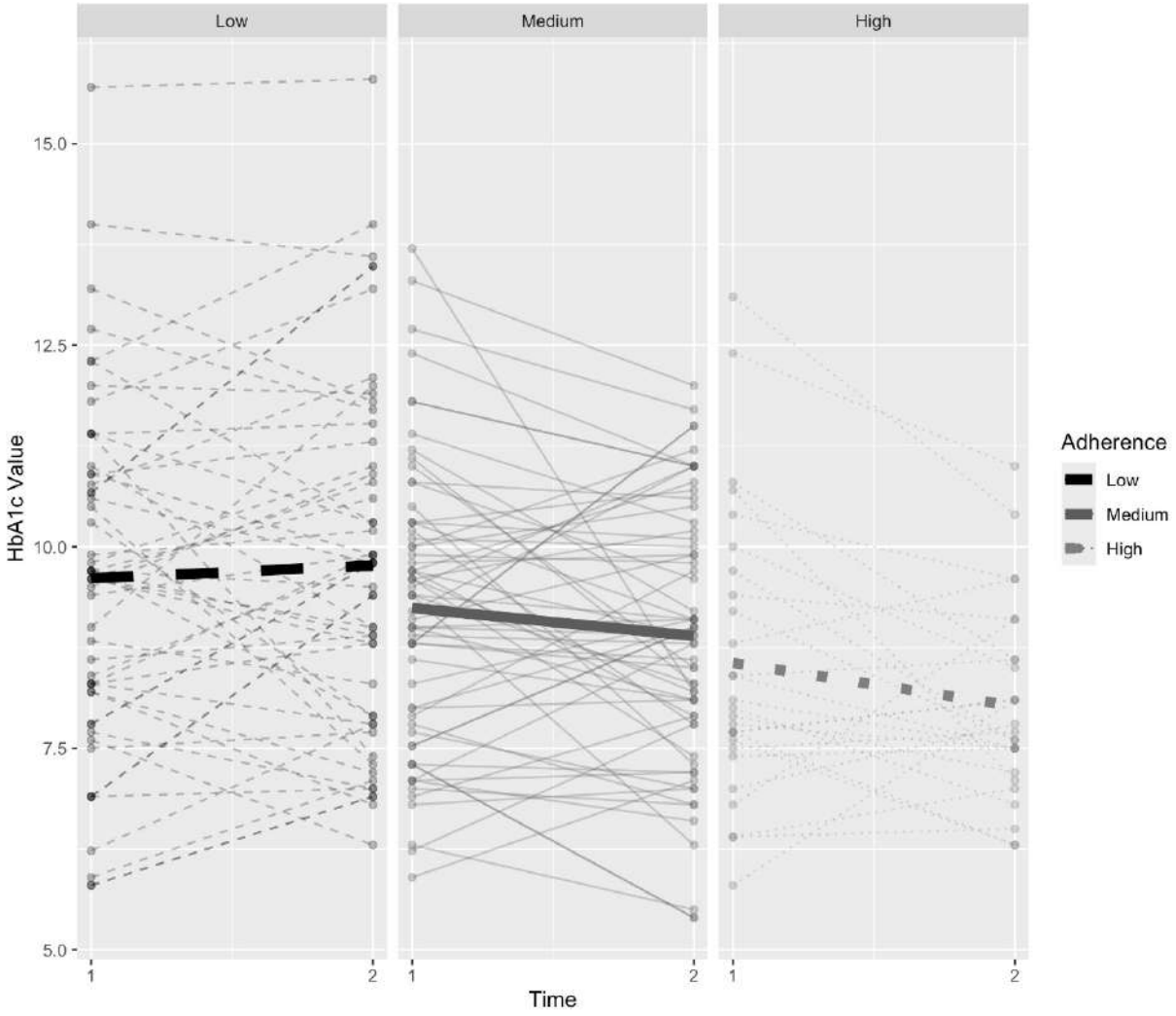

The above figure illustrates a vertical box whisker plot with the average of the two HbA1c readings along the Y axis and the self-maintenance groups on the X axis. The median values of the average of the two HbA1c readings. The box covers the interquartile interval with lower, and the upper border of the box means the lower (25th) and upper quartiles (75th). The whiskers represent the two lines extending from the minimum value to the lower quartile and from the upper quartile to the maximum value. The black dot represents the outliers.

***Figure 12: HbA1c trend from baseline to follow-up in self-maintenance tertiles***




The above figure shows a spaghetti plot of overall trends of HbA1c among the participants. Spaghetti plots explore overall trends of HbA1c values in baseline self-maintenance tertiles at baseline and then follow up at 6 6-month period. It also looks for interactions in longitudinal repeated measures data. Here, we are attempting to demonstrate the two aspects - First, how much variability is there between individual units at baseline in the three self-maintenance tertiles? Second, how much variance is there within HbA1c over 6 months? We have drawn a spaghetti plot with separate lines for each unit. The space between lines represents between unit variability, and the change in each line (slope) represents within variability.

***Figure 13: HbA1c trend from baseline to follow-up in adherence tertiles***




The above figure shows a spaghetti plot of overall trends of HbA1c among the participants. Spaghetti plots explore overall trends of HbA1c values in baseline adherence tertiles at baseline and then follow up at 6-month period. It also looks for interactions in longitudinal repeated measures data. Here, we are attempting to demonstrate the two aspects - First, how much variability is there between individual units at baseline in the three adherence tertiles? Second, how much variance is there within HbA1c over 6 months? We have drawn a spaghetti plot with separate lines for each unit. The space between lines represents between unit variability, and the change in each line (slope) represents within variability.

**Regression analysis**

We created 2 logistic regression models driven by the theory of Andersen model.

Glycemic status ~ intercept + composite clinical condition score category + composite SES score category + adherence score tertiles + $\varepsilon_0$

Glycemic status ~ intercept + composite clinical condition score category + composite SES score category + self-maintenance score tertiles + $\varepsilon_0$

Constructing of the composite socio-demographic score category and composite clinical condition category are given in annexures.

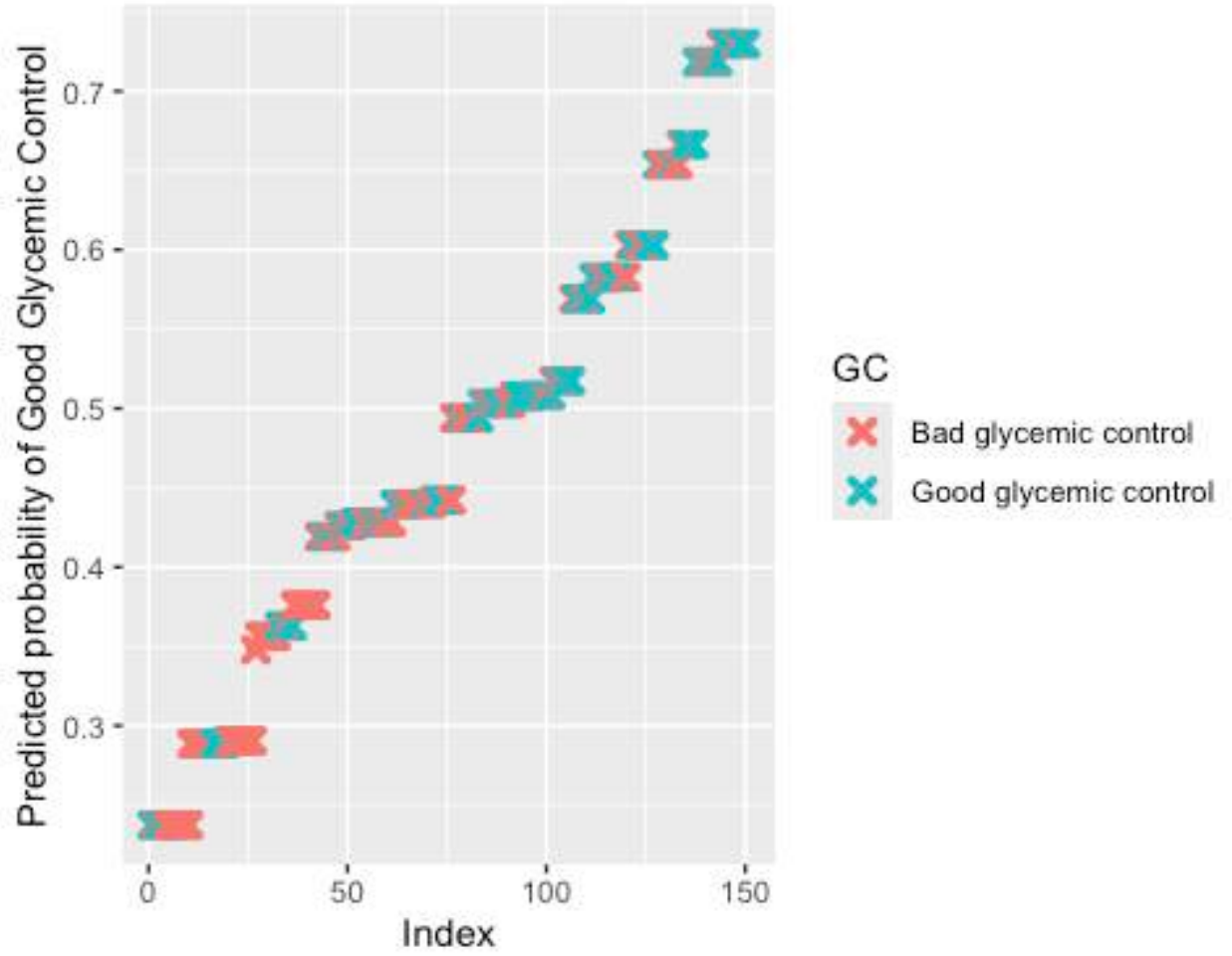
***Table 40: Model 1 showing glycemic status influenced by self-maintenance score with SES and clinical condition as covariates***

| Characteristic | OR[1] | 95% CI[1] | p-value |
|---|---|---|---|
| Composite SES score category | | | |
| Low | — | — | |
| Medium | 1.78 | 0.77, 4.18 | 0.2 |
| High | 1.32 | 0.56, 3.12 | 0.5 |
| Composite clinical condition score category | | | |
| Low | — | — | |
| Medium | 1.94 | 0.85, 4.47 | 0.12 |
| High | 1.83 | 0.79, 4.32 | 0.2 |
| Self-maintenance tertile | | | |
| Low | — | — | |
| Medium | 1.30 | 0.59, 2.90 | 0.5 |
| High | 2.52 | 1.11, 5.89 | **0.029** |

[1]OR = Odds Ratio, CI = Confidence Interval

Table 40 shows logistic regression model showing glycemic status influenced by self-maintenance score tertiles with composite socio-economic status (SES) score category and composite clinical condition score category as covariates. It shows that both SES & clinical condition do not significantly affect glycemic control, but higher tertiles of self-maintenance significantly affect it. Being in the high tertile of self-maintenance shows a 2.52 times chance of having good glycemic control.

***Figure 14: predicted probabilities of good glycemic control by model 1***




The above figure shows the predicted probabilities of having good glycemic control based on the logistic regression model made in model 1

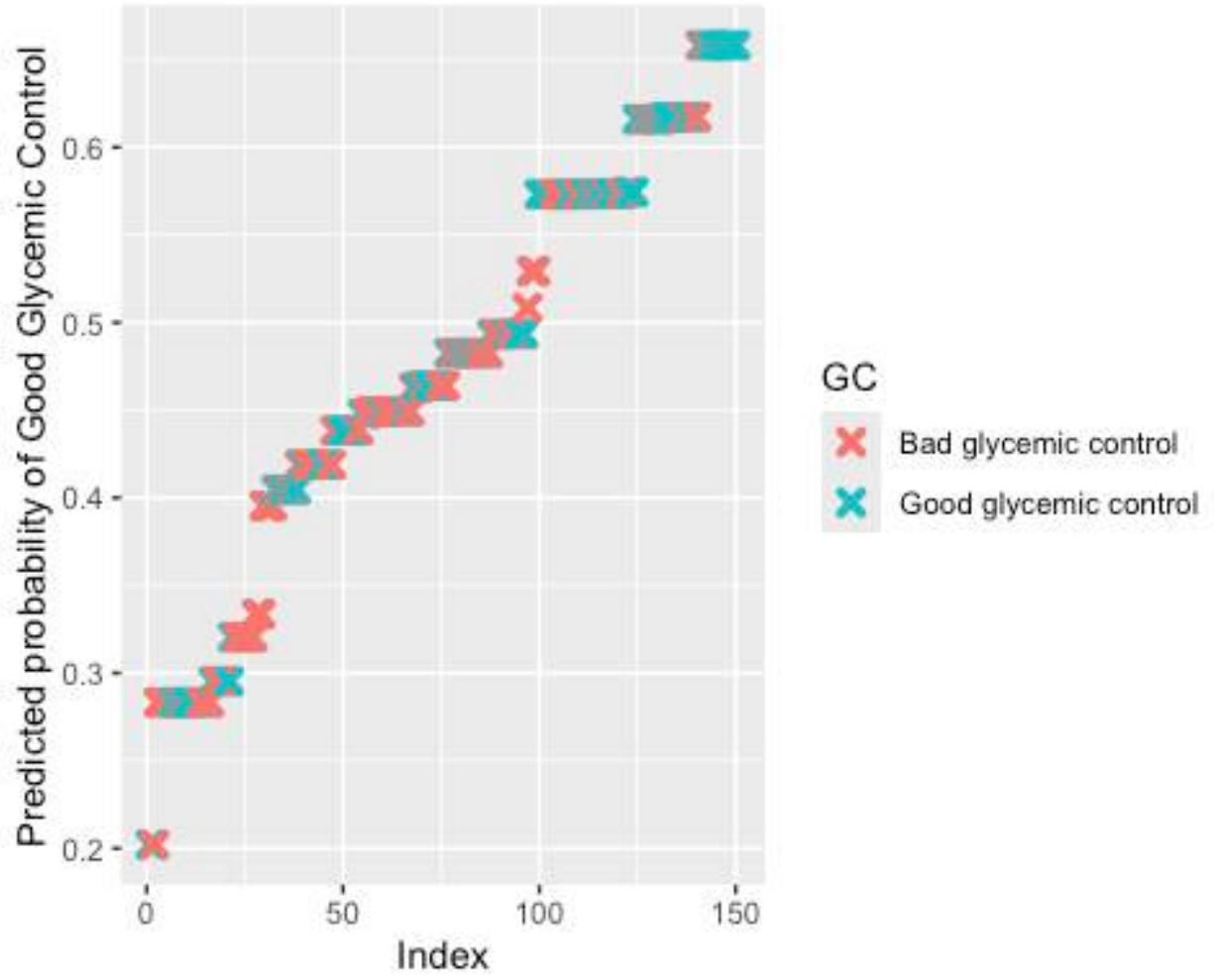
***Table 41: Model 2 showing glycemic status influenced by adherence score with SES and clinical condition as covariates***

| **Characteristic** | **OR**[1] | **95% CI**[1] | **p-value** |
|---|---|---|---|
| Composite SES score category | | | |
| Low | — | — | |
| Medium | 1.98 | 0.85, 4.71 | 0.12 |
| High | 1.65 | 0.64, 4.36 | 0.3 |
| Composite clinical condition score category | | | |
| Low | — | — | |
| Medium | 2.06 | 0.92, 4.73 | 0.081 |
| High | 1.72 | 0.75, 4.02 | 0.2 |
| Adherence tertiles | | | |
| Low | — | — | |
| Medium | 1.19 | 0.55, 2.58 | 0.7 |
| High | 0.64 | 0.21, 1.87 | 0.4 |

[1]OR = Odds Ratio, CI = Confidence Interval

Table 41 shows logistic regression model showing glycemic status influenced by self-maintenance score tertiles with composite socio-economic status (SES) score category and composite clinical condition score category as covariates. None of the predictor variables showed any significant effect in glycemic control.

***Figure 15: predicted probabilities of good glycemic control by model 2***




The above figure shows the predicted probabilities of having good glycemic control based on the logistic regression model made in model 2

***Table 42: Model 1 & 2 showing OR for having good glycemic control***

| | Model-1 | | Model-2 | |
|---|---|---|---|---|
| **Characteristic** | **OR**[12] | **SE**[2] | **OR**[12] | **SE**[2] |
| (Intercept) | 0.31** | 0.433 | 0.40* | 0.405 |
| Composite SES score category | | | | |
| Low | — | — | — | — |
| Medium | 1.78 | 0.431 | 1.98 | 0.436 |
| High | 1.32 | 0.436 | 1.65 | 0.488 |
| Composite clinical condition score category | | | | |
| Low | — | — | — | — |
| Medium | 1.94 | 0.421 | 2.06 | 0.416 |
| High | 1.83 | 0.433 | 1.72 | 0.427 |
| Self-maintenance tertile | | | | |
| Low | — | — | | |
| Medium | 1.30 | 0.406 | | |
| High | 2.52* | 0.424 | | |
| Adherence tertile | | | | |
| Low | | | — | — |
| Medium | | | 1.19 | 0.392 |
| High | | | 0.64 | 0.550 |

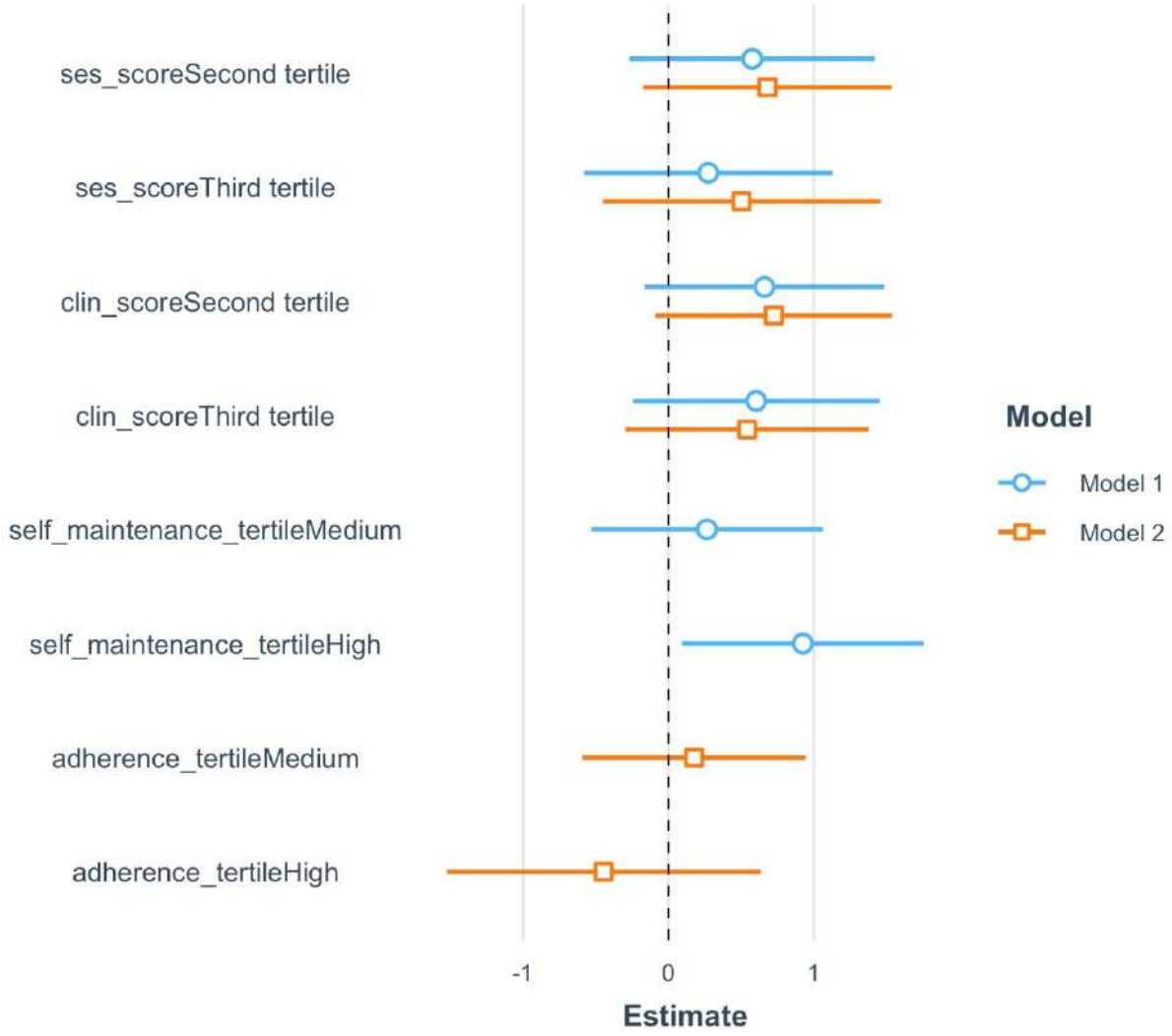
[1]*p<0.05; **p<0.01; ***p<0.001

[2]OR = Odds Ratio, SE = Standard Error

AIC = 210; BIC = 231; Residual df = 143; No. Obs. = 150

Table 42 shows models 1 & 2 showing the odds ratios for having good glycemic control along with its standard error. It shows that both SES, clinical condition & adherence scores do not significantly affect glycemic control, but higher tertiles of self-maintenance significantly affect it. Being in the high tertile of self-maintenance shows a 2.52 times chance of having good glycemic control, with a SE of 0.424.

***Figure 16: Regression plot showing various estimates of each covariate as predicted by model 1 & model 2***




The above figure shows the significant determinants of glycemic control as predicted by models 1 & 2, showing the odds ratio regression plot where all the variables on the y-axis and the odds ratio are on the x-axis. The dotted line shows no association between the variables, while values to the right of this line show greater risk, the small square represents the odds ratio, and the horizontal line shows the confidence interval with the upper and lower limits. Self-maintenance showed a significant protective effect on glycemic control.

# DISCUSSION

## ***DISCUSSION***

This dissertation uses a novel approach to examine the patterns of behavior related to specific sub-constructs of healthcare seeking among individuals with type 2 diabetes who use insulin and its possible impact on the euglycemic/dys-glycaemic trajectories of insulin users.

Andersen's behavioral model was used as a structural framework to understand healthcare-seeking behavior and how it can influence positive health outcomes. The domains focused on in this dissertation that may influence healthcare-seeking behavior were sociodemographic & diabetes-related factors, perceived acceptance & readiness to treatment, as well as facilitators and barriers to insulin use. Healthcare-seeking behavior was mainly defined by two parameters: insulin adherence & self-maintenance. This study was conducted in the urban field practice areas of AIIMS Bhopal.

### Socio-demographic characteristics

In this study, among the 150 participants, 27% used insulin alone for their diabetes treatment. The majority of participants are > 60 years of age, with a mean age of 55 years, which is to be expected as insulin-using patients with type 2 diabetes are usually above 56 years of age. Similar findings were seen in a study done in Mexico to see insulin adherence in low-income people with type 2 diabetes(47). An almost equal proportion of males and females were seen in this study. The equal proportion was purely due to chance. Still, similar proportions were seen in a study done at AIIMS Rishikesh, which looked into insulin non-adherence & barriers to insulin initiation(48)**.** Almost 3/4$^{th}$ of participants had less than an intermediate level of education, more than half belonged to the unemployed/retired/homemaker category & almost half had a monthly income of < 10,000 Rs. This is mostly reflective of the patients present in the urban practice area of AIIMS Bhopal. A similar study in Bangladesh to understand the health-seeking behavior and glycemic control in people with type 2 diabetes also showed a socio-economic profile(45).Most participants used a pen to deliver insulin, with ≤2 daily injections. An RCT done in Helsinki, which explored patient preference for insulin delivery, showed this(49). They had a mean duration of disease of 12 years & a mean duration of insulin use of 2.6 years.

Participants using insulin + OHA instead of only insulin showed better glycemic control (HbA1c <7) at baseline**.** This is unlike the findings seen in most studies, like the study that looked at glycemic control in people with diabetes in the US, from the data between the NHANES I and NHANES III surveys(50) or the study done in Oregon to look at the predictors of glycemic control in insulin using people with type 2 diabetes(51). The most probable reason could be that although adding OHAs might help glycemic control, most people in Bhopal cannot afford both treatment modalities. So, in patients with poor glycemic control, it is usually stopped when OHAs stop helping much.

### Insulin adherence & self-maintenance

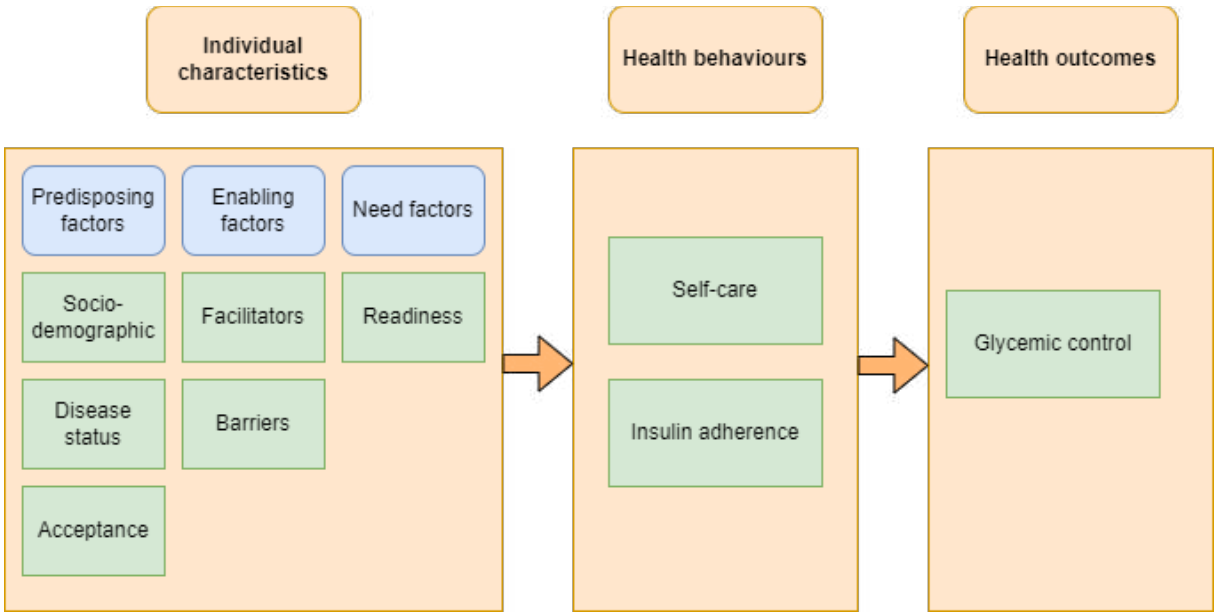
The mean (SD) of the insulin adherence score of the participants was 8.19 (2.18) out of a total score of 12. 20% of the participants fell in the relatively low adherence group using questions from the ARMS-D questionnaire. A study done in Tehran to estimate insulin adherence using the Moriskey medication adherence scale showed a 28% non-adherence

rate(52). The lower percentage could be attributed to the differences in the scale used or the population. And the mean (SD) of self-maintenance was 8.83 (2.19) out of a total score of 16. 60% of the participants fell in the relatively high self-maintenance group. A study done in Ethiopia to assess the self-care practices in people with diabetes showed a 55% prevalence in self-care practices(53).

**Andersen's behavioral model**

Coming to the theoretical framework of Andersen's behavioral model, the individual factors that affect healthy behaviors are mainly divided into predisposing, enabling & need factors.

**Figure 16: Structural framework based on Andersen's model used in this study**




The above figure shows the structural framework used in the study, based on Andersen's behavioral model, to understand the uptake of healthy behaviors among participants, which in turn can improve their health outcomes.

**Predisposing factors**

Most participants in the relatively low adherence group were <60. This may be because younger people find it difficult or embarrassing to take injections at workplaces or in social situations. Also, lower-income groups had low adherence. An internet survey done in the US showed that younger age and lower income, along with other factors, cause insulin omission(54). Also, people already on anti-hypertensive medication showed higher adherence. A study done in Ethiopia that explored the factors the affect adherence showed how being adherent to BP medications and having one BP controlled can improve one's adherence(55).

Among the perceived acceptance, a higher proportion of participants who had relatively high adherence thought they depended on insulin, did not think that insulin caused them

harm, and understood that it was necessary to start it. A study done in China about beliefs about medicines and non-adherence in patients with stroke, diabetes, and rheumatoid arthritis found that patients who found the treatment less harmful and more necessary had better adherence(56)**.** This study also used beliefs about medication questionnaires like our study. Also, a study done in New Zealand on illness and treatment perception in people with diabetes showed the importance of patients feeling that they were dependent on their insulin(57). Also, they felt less disrupted by insulin in their daily activities. This indicates a higher level of acceptance among the group with higher adherence. Most participants with relatively high self-maintenance were concerned regarding insulin side effects. A study in Palestine showed similar findings using a BMQ questionnaire showing the effect of concern in adherence(58)**.** This might be because they were more conscious about their health, which helps them improve their self-maintenance but makes them more cautious of insulin.

**Enabling factors**

Among facilitators for insulin use, a higher proportion of participants with relatively high adherence had a review of instruction within the past 6 months. A study done in California to improve injection technique showed a similar result(59)**.** Most participants with relatively high self-maintenance and adherence were said to have received their injection training from a diabetic specialist. A study done in Italy on optimizing injection techniques shows the importance of injection training(60)**.** This shows the importance of facilitators in improving adherence and self-maintenance**.**

Among the barriers to insulin use, a higher proportion of participants with relatively low adherence felt frustrated due to the strict schedule. A multi-national cross-sectional study on the timing of injection and adherence showed how flexible schedules improved adherence and strict schedules were bad for it(61)**.** The low adherence group also had more bleeding from the injection site as compared to the relatively high adherence group. Most participants with relatively low self-maintenance said they often felt embarrassed due to insulin injections. The internet survey done in the US also showed how bleeding from the injection site & embarrassment can adversely affect insulin adherence(62)**.** This shows how more barriers can lead to poor adherence and self-maintenance**.**

**Need factors**

Among perceived readiness, a higher proportion of participants with relatively high adherence were more anxious regarding their condition. A study done in the US exploring the factors affecting adherence shows how important readiness for medication is to having good adherence(63)**.**

Most participants with relatively higher adherence said they were satisfied with their insulin therapy. A study done in Israel that explored the relationship between treatment adherence and patient satisfaction showed how important perceived satisfaction is for maintaining adherence(64).

The study's first objective focused on understanding how the individual characters mentioned in Andersen’s model help predict positive health behaviors. In this case, having

a higher perceived acceptance & readiness, having more facilitators & fewer barriers to insulin use can lead to improved insulin adherence & self-maintenance.

**Glycemic control**

The study's second objective focused on how these positive health behaviors influence a person's glycemic trajectory. Adjusting for the individual factors of a person and how the behaviour alone can improve glycemic control.

Of 150 participants, 53% showed poor glycemic control, with most being achievers (Avg. HbA1c between 8-10 & follow-up HbA1c coming down). A study done in the US looking at the racial and ethnic differences in glycemic control also showed a similar, 52% proportion in insulin users with poor glycemic control(65).

Participants having a family history of diabetes, a higher mean duration of diabetes & a higher mean duration of insulin use, showed poorer glycemic control. Family history being a significant risk factor for diabetes, also makes it more probable to be less controlled. More than half of the participants were on anti-hypertensive drugs. Out of them, a higher proportion (66%) of participants in the good glycemic control group were already on anti-hypertensive medications**.** This might be because of the habit of being in another chronic medication regimen, with similar behavioral change needs, helping maintain proper glycemic control. A cohort study done in China on adding a hypertensive drug to improve glycemic control also shows the synergism of the two conditions(66).

Most participants with good glycemic control used a pen as their injection device. This shows how the device might impact their glycemic control. A study done in Taiwan on improving health-related quality of life and glycemic control(67) shows the same result. A higher proportion of good glycemic control group participants had a diabetic specialist as their injection instructor. This shows that proper instruction is important to maintain glycemic control. A study done in the US on optimizing insulin injection technique and glycemic control shows this point(68).

Most participants with good glycemic control belonged to the overweight & obese BMI category. This shows how weight reduction is important for glycemic control. This is a well-established fact, as explained by this cohort study done in the US, focusing on the importance of weight loss in glycemic control(69).

**Effect of adherence on glycemic control**

Not being able to be fully compliant to a chronic medication is a very human thing to do. It is all the more important when one has to take injections every day. In this study, most participants with good glycemic control rarely forgot to take insulin. Also had a higher adherence score. This shows that proper medication compliance is important for glycemic control. This is confirmed by multiple studies, like this retrospective study done in Scotland that focused on how insulin adherence improves glycemic control in type 2 diabetes(70) & this study done in Japan that established how important insulin adherence is for attaining satisfactory glycemic control(71).

**Effect of self-maintenance on glycemic control**

A higher proportion of participants from the bad glycemic control group currently consumed alcohol (27%) as compared to the good glycemic control group(9.9%). This shows how alcohol adversely affects glycemic control, as shown by this systematic review that focuses on multiple articles that establish the relationship between alcohol intake and poor glycemic control in people with type 2 diabetes(72).

Most participants with good glycemic control checked their blood glucose levels regularly. A meta-analysis on various papers related to blood glucose monitoring and glycemic control in people with type 2 diabetes(73) shows how regular RBS monitoring is important for good glycemic control. They also had a higher self-maintenance score. Thus, it reiterates the importance of behavioral changes and their maintenance in diabetes mellitus. A study done in Rochester for promoting self-management through self-determination theory showed this point(74).

In multivariable logistic regression, participants in the high self-maintenance tertile had a 2.5 times chance of being in good glycemic control after removing the effect of socio-demographic and clinical factors. Diabetes is a chronic condition, with multiple evidence showing how it can be controlled by maintaining the necessary behavioral changes like regular physical activity, healthy diet, quitting substance use, regular blood sugar monitoring, or even regular visits to the doctor. Another study done in Oregon that looked at the predictors of glycemic control in insulin using people with type 2 diabetes showed the importance of self-care, diet, and exercise in glycemic control(75). Also, for insulin users, when it becomes more challenging to maintain these healthy behaviors, which was shown in this exploratory study done in Portugal which tried to understand the difficulties in self-care among type 1 insulin users(76), it is necessary to find ways to make it easier for them.

# Strengths & Limitations

## *STRENGTHS & LIMITATIONS*

### STRENGTHS

This study tried to understand the factors affecting insulin use in people with type 2 diabetes by utilizing a novel approach, with the help of Andersen's behavioral model. Utilizing Andersen's model helped this study get a more wholistic approach of the various individual (modifiable & non-modifiable) factors that may influence their behavior.

This is also one of the few studies exploring the factors influencing insulin use in people with type 2 diabetes in India. This sutdy also tried to predict the glycemic trajectories of the participants based on their healthy behaviors.

Their perception, as well as outside influences, were explored. A psychometric tool was developed to understand the different domains involved. The questionnaire was framed in such a way that it could encapsulate these different domains. The focus on multiple domains to understand health-seeking behavior in people with diabetes has rarely been done.

This study also underlines the need for a comprehensive approach to diabetes treatment incorporating clinical, behavioral, and social elements to provide the best possible health outcomes for people who use insulin.

### LIMITATIONS

This study was a part of the dissertation/thesis. Hence, there were feasibility issues for recruiting larger study participants from different areas. Hence, due to the limited sample size and purposive sampling method, the generalizability of the results cannot be achieved.

Furthermore, an attempt to make psychometric tools for understanding constructs like perceived acceptance & readiness, facilitators & barriers to using insulin, insulin adherence & self-maintenance was made. These tools were developed and content validated; however, for further validation and factor analysis, we lacked the sample size.

Also, the health-seeking behavior was measured only at the baseline, making the assumption that the behavioral patterns of the participants would not change during the period of the study.

Regardless of these limitations, the study might create a good platform for researchers to do further research and understand factors affecting insulin use and glycemic control better. Using an established behavioral model framework could be considered an important strength to better understand, describe, and identify factors that predict the health-seeking behavior of these participants.

# CONCLUSION

## ***CONCLUSION***

Using Andersen's behavioral model as a structural framework, this dissertation emphasizes the role of healthcare-seeking behaviors. Constructs like perceived acceptance & readiness and facilitators & barriers for insulin use were explored, as well as how they affected insulin adherence & self-maintenance. The role of insulin adherence and self-maintenance in influencing glycemic control among people with type 2 diabetes who use insulin was explored.

The results highlight the critical roles that facilitators and barriers to insulin use, clinical settings, patients' perceived acceptance and readiness, and sociodemographic characteristics play in influencing these behaviors. Improved glycaemic control was linked to higher levels of self-maintenance and adherence, whereas poorer behaviors, including drinking alcohol and not checking blood sugar, were linked to lower outcomes.

The study highlights the significance of addressing individual and systemic issues to improve self-maintenance and adherence and achieve better glycemic outcomes. The study also focused on reducing obstacles to insulin use and empowering patients to manage their diabetes by offering sufficient knowledge, support, and flexibility in treatment programs. This study reinforces the necessity for a holistic strategy in diabetes management that combines behavioral, social, and clinical components to obtain optimal health outcomes for insulin-using individuals.

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# ANNEXURES

**ANNEXURES**

1. Participants information sheet -English
2. Participants information sheet- Hindi
3. Informed consent form
4. Data collection sheet
5. Constructing composite socio-demographic score category
6. Constructing composite clinical condition score category
7. Data Excel sheet

**Annexure 1**

**PARTICIPANT INFORMATION SHEET (PIS)**

1. **STUDY TITLE:** "Healthcare seeking behaviour and its association with Glycaemic control amongst Insulin users in Type 2 Diabetes - A Community based longitudinal study"

2. **STUDY INVESTIGATORS:**

**Post Graduate Student:**
Dr. Akhil Jaison
Junior Resident (Academic),
Department of Community and Family Medicine,
All India Institute of Medical Sciences Bhopal,
Saket Nagar, Bhopal

**Guide:**
Dr. Ankur Joshi
Assistant Professor
Department of Community and Family Medicine,
All India Institute of Medical Sciences Bhopal,
Saket Nagar, Bhopal

**Co-Guide:**
Dr. Rajnish Joshi
Professor & Head,
Department of General Medicine,
All India Institute of Medical Sciences Bhopal,
Saket Nagar, Bhopal

**Co-Guide:**
Dr. Abhijit Pakhare
Associate Professor
Department of Community and Family Medicine,
All India Institute of Medical Sciences Bhopal,
Saket Nagar, Bhopal

3. **Introduction:** We are conducting a research study to understand health seeking behaviour of insulin users in AIIMS Bhopal. Diabetes is a growing concern, owing to its increasing prevalence, making insulin use also much more common. Insulin being a self-injectable, long-term therapy has a lot of challenges for its proper use, a few of them being lack of acceptance, difficulty in procurement, lack of awareness about the drug or its technique of usage, lack of adherence to its treatment, problems with storage etc. It is also grossly different from other oral anti-diabetic therapy in many factors like its strict scheduling, perceived inconvenience, pain during injection, embarrassment etc, to name a few. The factors that may predict these are multi-dimensional, which may translate into improved glycaemic control and in turn better outcome of the disease, hence

making the exploration and understanding of these factors very important. If you agree to take part voluntarily, we will ask you to sign a consent form.

4. **Purpose of the study:** Aim of this study is to understand the various factors affecting the healthcare seeking behaviour, and how these factors can affect the glycaemic control and the overall progression of the disease.

5. **Taking part – what it involves:**

a. **Do I have to take part?**
Participation in this research is entirely voluntary. A decision to not take part, or to withdraw at any time, will not affect your rights or medical care in any way.

b. **What is expected of me if I take part?**
If you participate, we will administer a questionnaire to understand the factors affecting your health seeking behaviour, conduct a few routine blood tests and an Hba1c to estimate your glycaemic control.

c. **How long will my part in the study last?**
Your participation in the study would last for 2 years, with two follow up visits for HbA1c estimation.

d. **Do I have to come for extra visits or undergo extra investigations for the study?**
There will be two follow up visits to get HbA1c tests done.

e. **What are the possible benefits in taking part?**
The study will help to understand the health seeking behaviours and various factors that affect it among insulin users of type 2 diabetes. It will also help understand how each of these factors will affect the glycaemic control of the person, thus paving way to methods that might reduce these factors that might hinder health seeking and hopefully improve the burden of the disease.

f. **What are the possible disadvantages and risks of taking part?**
Minimal risk of loss of privacy and confidentiality of information collected even though all possible measures will be taken to ensure safe data storage and access.

g. **What happens to the information collected from me?**
All information collected will be kept strictly confidential and not shared with anyone. Results from the study will be reported as group data and will not identify you in any way.

h. **What if I change my mind regarding participation in the study?**
You are entitled to change your mind and withdraw at any time during the study without any disadvantage or penalty.

i. **Whom do I contact for more information or if I have further questions or concerns?**

If you want any information or have questions or concerns, you can contact:

**Dr. Akhil Jaison**
Junior Resident (Academic),
Department of Community and Family Medicine,
All India Institute of Medical Sciences Bhopal,
Saket Nagar, Bhopal
Mob. No. 8848667390
akhilj.jr2022@aiimsbhopal.edu.in

**Dr. Shashank Purwar**
Member Secretary
Institute Ethics Committee-Student Research,
Mob No. 7773010099,
ihecpgr@aiimsbhopal.edu.in

**Annexure 2**

**<u>प्रतिभागी सूचना पत्र</u>**

1. **अध्ययन का शीर्षक**: "टाइप 2 मधुमेह में इंसुलिन उपयोगकर्ताओं के बीच स्वास्थ्य सेवा चाहने वाला व्यवहार और ग्लाइसेमिक नियंत्रण के साथ इसका जुड़ाव - एक समुदाय आधारित अनुदैर्ध्य अध्ययन"

2. **अध्ययन जांचकर्ता:**
   **स्नातकोत्तर विद्यार्थी**:
   डॉ. अखिल जैसन,
   जूनियर रेजिडेंट (अकादमिक),
   समुदाय और परिवार चिकित्सा विभाग,
   अखिल भारतीय आयुर्विज्ञान संस्थान भोपाल,
   साकेत नगर, भोपाल

   **गाइड**:
   डॉ. अंकुर जोशी
   सहायक प्रोफेसर
   समुदाय और परिवार चिकित्सा विभाग,
   अखिल भारतीय आयुर्विज्ञान संस्थान भोपाल,
   साकेत नगर, भोपाल

   **सह-गाइड**:
   डॉ. रजनीश जोशी
   प्रोफेसर और प्रमुख,
   सामान्य चिकित्सा विभाग,
   अखिल भारतीय आयुर्विज्ञान संस्थान भोपाल,
   साकेत नगर, भोपाल

   **सह-गाइड**:
   डॉ. अभिजीत पखारे,
   सह - आचार्य
   समुदाय और परिवार चिकित्सा विभाग,
   अखिल भारतीय आयुर्विज्ञान संस्थान भोपाल,
   साकेत नगर, भोपाल

3. **परिचयः** हम एम्स भोपाल में इंसुलिन उपयोगकर्ताओं के स्वास्थ्य संबंधी व्यवहार को समझने के लिए एक शोध अध्ययन कर रहे हैं। मधुमेह एक बढ़ती हुई चिंता है, इसके बढ़ते प्रचलन के कारण, इंसुलिन का उपयोग भी अधिक सामान्य हो गया है। इंसुलिन एक स्व-इंजेक्शन योग्य होने के कारण, दीर्घकालिक चिकित्सा में इसके उचित उपयोग के लिए बहुत सारी चुनौतियाँ हैं। उनमें से कुछ में स्वीकृति की कमी, खरीद में कठिनाई, दवा या इसके उपयोग की तकनीक के बारे में जागरूकता की कमी, इसके उपचार के पालन की कमी, भंडारण की समस्याएं आदि हैं। यह अन्य एंटी-डायबिटिक ओरल थेरेपी से भी काफी अलग है। इसके सख्त कार्यक्रम,

कथित असुविधा, इंजेक्शन के दौरान दर्द, शर्मिंदगी आदि जैसे कई कारक कुछ नाम हैं। कारक जो इसकी भविष्यवाणी कर सकते हैं वे बहु-आयामी हैं, जो बेहतर ग्लाइसेमिक नियंत्रण में परिवर्तित हो सकते हैं और रोग के बेहतर परिणाम दे सकते हैं, इसलिए इन कारकों की खोज और समझ को बहुत महत्वपूर्ण बनाते हैं। यदि आप स्वेच्छा से भाग लेने के लिए सहमत हैं, तो हम आपसे एक सहमति फॉर्म पर हस्ताक्षर करने के लिए कहेंगे।

4. **अध्ययन का उद्देश्यः** इस अध्ययन का उद्देश्य स्वास्थ्य सेवा चाहने वाले व्यवहार को प्रभावित करने वाले विभिन्न कारकों को समझना है, और कैसे ये कारक ग्लाइसेमिक नियंत्रण और रोग की समग्र प्रगति को प्रभावित कर सकते हैं।

5. **भाग लेना – इसमें क्या शामिल है?**

a. **क्या मुझे भाग लेना चाहिए?**
इस अनुसंधान में भाग लेना पूर्णतः स्वैच्छिक है । भाग नहीं लेने का निर्णय या किसी भी समय अपना नाम वापस लेने से, किसी भी रूप में आपके अधिकारों या आपकी चिकित्सा देखभाल पर कोई विपरीत प्रभाव नहीं पड़ेगा।

b. **यदि मैं इसमें शामिल होता हूं तो मुझसे क्या अपेक्षित हैं?**
यदि आप भाग लेते हैं, तो हम आपके स्वास्थ्य संबंधी व्यवहार को प्रभावित करने वाले कारकों को समझने के लिए एक प्रश्नावली देंगे, कुछ नियमित रक्त परीक्षण करेंगे और आपके ग्लाइसेमिक नियंत्रण का अनुमान लगाने के लिए एचबीए1सी करेंगे।

c. **अध्ययन में मेरी भागीदारी कब तक चलेगी?**
HbA1c आकलन के लिए दो अनुवर्ती यात्राओं के साथ, अध्ययन में आपकी भागीदारी 2 वर्षों तक चलेगी।

d. **क्या मुझे इस अध्ययन के लिए अलग से आना पड़ेगा या अतिरिक्त जांच जरूरी होगी?**
HbA1c परीक्षण करवाने के लिए दो अनुवर्ती मुलाकातें होंगी।

e. **इसमें शामिल होने से संभावित लाभ क्या है?**
यह अध्ययन टाइप 2 मधुमेह के इंसुलिन उपयोगकर्ताओं के बीच स्वास्थ्य संबंधी व्यवहार और इसे प्रभावित करने वाले विभिन्न कारकों को समझने में मदद करेगा। यह यह समझने में भी मदद करेगा कि इनमें से प्रत्येक कारक व्यक्ति के ग्लाइसेमिक नियंत्रण को कैसे प्रभावित करेगा, इस प्रकार उन तरीकों का मार्ग प्रशस्त करेगा जो इन कारकों को कम कर सकते हैं जो स्वास्थ्य की मांग में बाधा डाल सकते हैं और उम्मीद है कि बीमारी के बोझ में सुधार होगा।

f. **इसमें भाग लेने से संभावित हानि एवं जोखिम?**
सुरक्षित डेटा भंडारण और पहुंच सुनिश्चित करने के लिए सभी संभव उपाय किए जाने के बावजूद एकत्र की गई जानकारी की गोपनीयता और गोपनीयता के नुकसान का न्यूनतम जोखिम।

g. **मेरे बारे में एकत्र की गई सूचना का क्या किया जाएगा?**

एकत्र की गई सभी सूचना पूर्णतः गोपनीय रखी जाएगी तथा अध्ययन से प्राप्त निष्कर्षों को अन्य किसी से साझा नहीं किया जाएगा । इन्हें ग्रुप आंकड़े के रूप मे रिपोर्ट किया जाएगा और किसी भी तरह से आपकी पहचान उजागर नहीं होगी ।

**h. इस अध्ययन मे भाग लेने के लिए मेरे विचार बदलने पर क्या होगा?**

अध्ययन के दौरान किसी भी समय बिना किसी क्षति या दंड के आपको अपने विचार बदलने का पूरा अधिकार है ।

**I. इस संबंध मे अधिक जानकारी के लिए या बाद मे मेरे मन मे कोई प्रश्न या शंका होने पर मुझ किनसे संपर्क करना होगा ?**

यदि आप कोई सूचना चाहते हैं या आपका कोई प्रश्न है या शंका है तो आप इन नंबरों पर संपर्क कर सकते हैं:

**डॉ. अखिल जैसन**
जूनियर रेजिडेंट (अकादमिक),
समुदाय और परिवार चिकित्सा विभाग,
अखिल भारतीय आयुर्विज्ञान संस्थान भोपाल,
साकेत नगर, भोपाल
Mob. No. 8848667390
akhilj.jr2022@aiimsbhopal.edu.in

**डॉ. शशांक पुरवार**
सदस्य सचिव,
संस्थान आचार समिति – छात्र अनुसंधान
Mob. No. 7773010099,
ihecpgr@aiimsbhopal.edu.in )

**Annexure 3**

**<u>प्रतिभागी सूचना सहमति प्रपत्र</u>**

**<u>[PARTICIPANT INFORMED CONSENT FORM (PICF)]</u>**

इस अध्ययन के लिए प्रतिभागी का पहचान नंबरः …….....

Participant Identification Number for this Study: ……...

अनुसंधान का शीर्षकः "टाइप 2 मधुमेह में इंसुलिन उपयोगकर्ताओं के बीच स्वास्थ्य सेवा चाहने वाला व्यवहार और ग्लाइसेमिक नियंत्रण के साथ इसका जुड़ाव - एक समुदाय आधारित अनुदैर्ध्य अध्ययन"

Title of Project : "Healthcare seeking behaviour and its association with Glycaemic control amongst Insulin users in Type 2 Diabetes - A Community based longitudinal study"

शोधकर्ता छात्र का नाम डॉ. अंकुर जोशी फोन नं: 8848667390

Name of Student Investigator :Dr. Akhil Jaison Tel No.(s) : 8848667390

शोध मार्गदर्शक का नाम : डॉ. अंकुर जोशी

Name of Thesis Guide : Dr. Ankur Joshi

मैंने दिनांक 20.08.2022 के सूचना पत्रक संस्करण II में दिए गए सभी तथ्यों को सावधानीपूर्वक पढ़ लिया है/ मुझे अपनी भाषा में स्पष्ट रूप से विस्तारपूर्वक समझा दिया गया है, और मैंने तथ्यों को पूर्णतः समझ लिया है। मैं पुष्टि करता/ करती हूँ, कि मुझे सवाल पूछने के अवसर प्रदान किए गए। The contents of the information sheet version II dated 20 August 2022 that was provided have been read carefully by me / explained in detail to me, in a language that I comprehend, and I have fully understood the contents. I confirm that I have had the opportunity to ask questions.

मुझे इस अध्ययन की प्रकृति एवं उद्देश्य और इसके संभावित जोखिमों / लाभों तथा अध्ययन की अनुमानित अवधि एवं अन्य प्रासंगिक जानकारी के बारे में विस्तारपूर्वक समझा दिया गया है। मुझे पता है कि इस अध्ययन में मेरी भागीदारी स्वैच्छिक है तथा मैं इस अध्ययन से किसी भी समय बिना कोई कारण बताए, अपना नाम वापस लेने के लिए स्वतंत्र हूं और नाम वापस लेने पर मेरी चिकित्सा देखभाल या कानूनी अधिकारों पर कोई प्रभाव नहीं पड़ेगा। The nature and purpose of the study and its potential risks/benefits and expected duration of the study, and other relevant details of the study have been explained to me in detail. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, without my medical care or legal right being affected.

मैं समझता/समझती हूं कि इस अनुसंधान में मेरी भागीदारी से मेरे बारे में एकत्र की गई जानकारी और मेरे चिकित्सीय दस्तावेजों के किसी भी भाग को एम्स के जिम्मेदार व्यक्तियों द्वारा ही देखा जाएगा। मैं इन व्यक्तियों को मेरे रिकॉर्ड प्राप्त करने की अनुमति प्रदान करता/ करती हूँ। I understand that the information collected about me from my participation in this research and sections of any of my medical notes may be looked at by responsible individuals from AIIMS. I give permission for these individuals to have access to my records.

यदि प्रतिभागी बच्चा है तो उसकी मौखिक या लिखित सहमति प्राप्त की गई है। If participants is child, his/her verbal or written assent has been obtained.

मैं उक्त अध्ययन में भाग लेने के लिए सहमत हूं/I agree to take part in the above study.

| |
|---|
| |

_____

(प्रतिभागी के हस्ताक्षर / बांए अंगूठे का निशान) (Signature/Left Thumb Impression)
दिनांक/Date……स्थान/Place …….....

प्रतिभागी का नाम/Name of the participant…….....
पिता/पति/पत्नी का नाम /Son/Daughter/Spouse of…….
डाक का पूरा पता /Complete Postal Address …….....

अगर अशिक्षित हों / If illiterate.
सूचना पत्र को प्रतिभागी को पढ़ा और समझाया गया है और प्रश्न पूछने का अवसर दिया गया है। मैं पुष्टि करता हूं कि व्यक्ति ने स्वतंत्र रूप से अपनी सहमति दी है ।
The information sheet has been read and explained to the participant and given the opportunity to ask questions. I confirm that the individual has given consent freely.

कानूनी रूप से स्वीकार्य प्रतिनिधि या निष्पक्ष गवाह के हस्ताक्षर
Signature of Legally acceptable representative or impartial witness.
दिनांक/Date
एलएआर या निष्पक्ष गवाह का नाम / Name of LAR or impartial witness .
पता / Address :-

प्रमाणित किया जाता है कि उक्त सहमति मेरी उपस्थिति में प्राप्त की गई ।
This is to certify that the above consent has been obtained in my presence.

_____

छात्र शोधकर्ता के हस्ताक्षर दिनांक……..स्थान……
Signature of the student Investigator Date …… Place ……

**Annexure 4**

**Data collection sheet**

Date of form filling

NCD Clinic/ CR number

Mobile number

1. Age
2. Sex
3. Area of residence
4. Religion
5. Caste category
6. What is your highest level of education?
7. What is your current occupation?
8. What is your monthly income?
9. Do you have any form of health insurance? (including Ayushman)
10. In a typical week, how often do you eat fruits/vegetables?
11. Do you currently smoke bidi/cigarette/pipes or any smokeless tobacco products like khaini/gutkha?
12. Do you currently consume alcoholic beverages like wine, beer, or other spirits?
13. During the past 12 months, have you ever tried to quit using tobacco or alcohol?
14. Do you have any family history of diabetes?
15. How old were you when you were diagnosed with diabetes(years)?
16. Does your family help you with your insulin injection?
17. How often do your friends/family urge you to visit the doctor?
18. How far on average, do you have to travel to refill your insulin?
19. Where do you usually buy your insulin from?
20. How would you say your condition is compared to peers of same age?
21. Do you have any of these conditions (tick all the appropriate options)?
22. How would you say your condition is compared to before starting insulin therapy?
23. Who taught you how to give your injections?
24. Which device do you normally use to inject insulin?
25. How long have you been using insulin(months)?
26. How many injections do you take per day?
27. When was the last time you received or reviewed instructions about your treatment from your treating doctor?

HbA1c, BP, Height (cm), Weight (Kg), s.Creatinine, s.LDL

28. On a scale of one to five, how healthy would you say you are?
29. On a scale of one to five, how often do you miss your doctor's appointments?
30. On a scale of one to five, how often do you eat food items (like sweets) that you have been asked to avoid by thedoctor?
31. On a scale of one to five, how strongly do you agree that you are regularly physically active?
32. On a scale of one to five, how satisfied are you with your insulin treatment?
33. On a scale of one to five, how strongly do you agree that your health depends on your insulin injection?
34. On a scale of one to fice, how often do you worry about the side-effects of insulin?
35. On a scale of one to five, how strongly do you agree that insulin disrupts your day-to-day activities?
36. On a scale of one to five, how difficult do you find at managing your insulin related expenses?
37. On a scale of one to five, how strongly do you agree that insulin is doing more harm than good?
38. On a scale of one to five, how strongly do you agree that switching to insulin was necessary for you?
39. On a scale of one to five, how painful would you describe your injection?
40. On a scale of one to five, how often does your injection site bleed or look bruised?
41. On a scale of one to five, how often have you woken up at night with symptoms like palpitations, anxiety, sweating,or dizziness after taking insulin?
42. On a scale of one to five, how often do you feel embarrassed or ashamed about injecting insulin in front of others?
43. On a scale of one to five, how often did you forget to take your insulin in the last 4 weeks?
44. On scale of one to five, how often did you choose not to take insulin in the past 4 weeks?
45. On a scale of one to five, how often did you plan ahead to refill your insulin in the last 4 weeks, before you ran out?
46. On a scale of one to five, how often do you stop taking insulin when I feel better
47. On a scale of one to five, how often do you check your blood glucose levels before each meal?
48. On a scale of one to five, how often do you adapt your insulin doses to the current blood glucose levels?
49. On a scale of one to five, how often do you adjust the timing of your injections to your food intake?
50. On a scale of one to five, how often do you feel frustrated by the strict eating and sleeping schedule due to insulintherapy?
51. On a scale of one to five, how severe would you say your condition is?
52. On a scale of one to five, how often do you feel depressed or anxious about the future because you have diabetes?

## Annexure 5

### Constructing composite socio-demographic score category

Each variable was given a higher score if it predisposed them to positive health behaviors.

In the age category, >60 years was given a score of 0, 45-60 was given 1 & <45 years was given 2.

In sex, female was given a score of 0, and male was given 2.

In the area of residence, rural was given a score of 0, and urban was given 2.

In religion, Hindu was given a score of 2, and non-Hindu was given 0.

In the caste category, SC/ST was given a score of 0, OBC given 1, and General given 2.

In education, upto primary was given a score of 0, upto intermediated given 1, graduate & above given 2.

In occupation, Unemployed/housewife/retired was given a score of 0, self-employed/private was given 1 & govt. was given 2.

In monthly income, <10,000 Rs was given a score of 0, 10,000 – 50,000 was given 1 & >50,000 was given 2.

The total score came out to be 16.

The participants were then divided into three equal tertiles: low, medium & high. Low tertile has the lowest scores, and high tertile has the highest scores, thus making the composite socio-demographic score category for comparing them with glycemic control groups.

**Annexure 6**

**Constructing composite clinical condition score category**

Participants with better clinical status at baseline were given a higher score.

In hypertension status, hypertensive participants were given a score of 0, pre-hypertensive was given 1 & normotensive was given 2.

In the BMI category, obese participants were given a score of 0; overweight was given 1 & normal was given 2.

In serum creatinine levels, >1.2 mg/dL was given a score of 0 & <1.2 was given 2.

In serum LDL level, >100 mg/dL was given a score of 0 & <100 was given 2.

Baseline HbA1c >8 was given a score of 0 & <8 was given 2.

The total score came out to be 10.

The participants were divided into three equal tertiles: low, medium & high. Low tertile has the lowest scores, and high tertile has the highest scores, thus making composite clinical condition score category for comparing them with glycemic control groups.

# Annexure 7: Dataset

| Age | Age category | Sex | Area of residence | Religion | Caste | Education |
|---|---|---|---|---|---|---|
| 60 | 45-60 | Male | Urban | Hindu | SC/ST | Upto intermediate |
| 68 | >60 | Male | Urban | Non-hindu | SC/ST | Graduate & above |
| 38 | <45 | Male | Urban | Hindu | SC/ST | Graduate & above |
| 53 | 45-60 | Male | Urban | Non-hindu | SC/ST | Upto Primary |
| 62 | >60 | Male | Urban | Hindu | SC/ST | Graduate & above |
| 63 | >60 | Male | Urban | Hindu | SC/ST | Upto Primary |
| 48 | 45-60 | Female | Urban | Hindu | OBC | Upto Primary |
| 32 | <45 | Male | Urban | Hindu | OBC | Upto intermediate |
| 24 | <45 | Female | Urban | Hindu | SC/ST | Graduate & above |
| 47 | 45-60 | Male | Urban | Hindu | OBC | Upto intermediate |
| 32 | <45 | Female | Urban | Hindu | OBC | Upto Primary |
| 65 | >60 | Female | Urban | Hindu | SC/ST | Upto Primary |
| 59 | 45-60 | Female | Urban | Hindu | OBC | Graduate & above |
| 68 | >60 | Female | Urban | Hindu | SC/ST | Upto Primary |
| 40 | <45 | Male | Urban | Hindu | SC/ST | Upto intermediate |
| 38 | <45 | Female | Urban | Hindu | OBC | Upto Primary |
| 38 | <45 | Male | Urban | Non-hindu | SC/ST | Graduate & above |
| 32 | <45 | Female | Urban | Hindu | General | Upto intermediate |
| 40 | <45 | Male | Rural | Hindu | OBC | Upto intermediate |
| 47 | 45-60 | Female | Urban | Hindu | General | Upto Primary |
| 42 | <45 | Male | Urban | Non-hindu | General | Upto intermediate |
| 66 | >60 | Female | Urban | Hindu | General | Upto Primary |
| 50 | 45-60 | Female | Urban | Hindu | General | Upto Primary |
| 66 | >60 | Female | Urban | Hindu | General | Upto Primary |
| 71 | >60 | Female | Urban | Non-hindu | General | Upto Primary |
| 71 | >60 | Male | Urban | Non-hindu | General | Graduate & above |
| 55 | 45-60 | Female | Urban | Non-hindu | OBC | Upto Primary |
| 72 | >60 | Male | Urban | Hindu | General | Upto intermediate |
| 63 | >60 | Male | Urban | Hindu | General | Graduate & above |
| 46 | 45-60 | Female | Rural | Hindu | OBC | Upto Primary |
| 71 | >60 | Male | Urban | Hindu | OBC | Graduate & above |
| 64 | >60 | Male | Urban | Hindu | OBC | Upto intermediate |
| 72 | >60 | Female | Urban | Non-hindu | OBC | Upto Primary |
| 61 | >60 | Female | Urban | Hindu | OBC | Upto Primary |
| 54 | 45-60 | Male | Urban | Hindu | OBC | Graduate & above |
| 60 | 45-60 | Female | Urban | Hindu | OBC | Upto Primary |
| 45 | 45-60 | Female | Urban | Hindu | OBC | Upto intermediate |
| 64 | >60 | Male | Urban | Hindu | OBC | Graduate & above |
| 51 | 45-60 | Male | Rural | Hindu | OBC | Upto Primary |
| 64 | >60 | Male | Rural | Hindu | OBC | Upto Primary |
| 54 | 45-60 | Female | Urban | Hindu | OBC | Upto intermediate |
| 70 | >60 | Female | Urban | Hindu | OBC | Upto intermediate |
| 76 | >60 | Male | Urban | Hindu | OBC | Upto intermediate |
| 64 | >60 | Male | Urban | Hindu | OBC | Upto intermediate |
| 48 | 45-60 | Male | Urban | Hindu | OBC | Graduate & above |
| 73 | >60 | Female | Urban | Hindu | OBC | Upto intermediate |
| 47 | 45-60 | Female | Urban | Non-hindu | OBC | Upto Primary |
| 63 | >60 | Male | Urban | Hindu | OBC | Graduate & above |
| 70 | >60 | Female | Urban | Hindu | OBC | Upto Primary |

| | | | | | | |
|---|---|---|---|---|---|---|
| 76 | >60 | Male | Urban | Hindu | OBC | Upto intermediate |
| 50 | 45-60 | Female | Rural | Hindu | OBC | Upto Primary |
| 47 | 45-60 | Male | Urban | Hindu | OBC | Graduate & above |
| 53 | 45-60 | Male | Urban | Hindu | OBC | Graduate & above |
| 47 | 45-60 | Female | Urban | Non-hindu | OBC | Upto intermediate |
| 56 | 45-60 | Male | Urban | Non-hindu | OBC | Upto intermediate |
| 53 | 45-60 | Male | Urban | Hindu | OBC | Upto intermediate |
| 79 | >60 | Male | Urban | Non-hindu | OBC | Graduate & above |
| 53 | 45-60 | Male | Urban | Hindu | OBC | Upto intermediate |
| 65 | >60 | Male | Urban | Hindu | OBC | Upto intermediate |
| 57 | 45-60 | Male | Urban | Hindu | OBC | Upto intermediate |
| 67 | >60 | Male | Urban | Hindu | OBC | Upto intermediate |
| 76 | >60 | Female | Urban | Hindu | OBC | Upto intermediate |
| 51 | 45-60 | Female | Urban | Hindu | OBC | Upto Primary |
| 45 | 45-60 | Female | Urban | Hindu | OBC | Upto Primary |
| 70 | >60 | Female | Urban | Hindu | OBC | Upto Primary |
| 65 | >60 | Female | Urban | Hindu | OBC | Upto Primary |
| 66 | >60 | Female | Urban | Hindu | OBC | Upto intermediate |
| 46 | 45-60 | Female | Urban | Hindu | OBC | Upto Primary |
| 67 | >60 | Male | Urban | Hindu | OBC | Graduate & above |
| 46 | 45-60 | Male | Urban | Hindu | SC/ST | Upto intermediate |
| 66 | >60 | Female | Urban | Hindu | SC/ST | Upto Primary |
| 32 | <45 | Female | Urban | Hindu | SC/ST | Upto intermediate |
| 62 | >60 | Male | Urban | Hindu | SC/ST | Upto Primary |
| 38 | >60 | Male | Rural | Hindu | OBC | Upto intermediate |
| 33 | >60 | Female | Urban | Hindu | SC/ST | Graduate & above |
| 44 | >60 | Male | Urban | Hindu | SC/ST | Upto intermediate |
| 36 | >60 | Male | Urban | Hindu | SC/ST | Graduate & above |
| 29 | >60 | Male | Urban | Hindu | SC/ST | Graduate & above |
| 73 | >60 | Female | Rural | Hindu | OBC | Upto Primary |
| 68 | >60 | Male | Urban | Hindu | OBC | Upto intermediate |
| 55 | 45-60 | Female | Urban | Hindu | SC/ST | Upto intermediate |
| 39 | >60 | Female | Urban | Hindu | SC/ST | Graduate & above |
| 70 | >60 | Female | Urban | Hindu | OBC | Upto Primary |
| 38 | >60 | Male | Rural | Non-hindu | OBC | Upto intermediate |
| 40 | >60 | Female | Urban | Hindu | SC/ST | Graduate & above |
| 60 | 45-60 | Female | Urban | Hindu | OBC | Upto intermediate |
| 62 | >60 | Female | Urban | Hindu | SC/ST | Upto intermediate |
| 44 | >60 | Female | Urban | Hindu | SC/ST | Graduate & above |
| 82 | >60 | Female | Urban | Hindu | SC/ST | Upto intermediate |
| 65 | >60 | Male | Urban | Hindu | SC/ST | Upto intermediate |
| 44 | >60 | Female | Urban | Hindu | SC/ST | Graduate & above |
| 67 | >60 | Male | Urban | Hindu | OBC | Graduate & above |
| 37 | >60 | Male | Urban | Hindu | OBC | Graduate & above |
| 71 | >60 | Male | Urban | Hindu | OBC | Graduate & above |
| 56 | 45-60 | Female | Urban | Hindu | OBC | Upto intermediate |
| 58 | 45-60 | Male | Urban | Hindu | OBC | Upto intermediate |
| 58 | 45-60 | Female | Urban | Hindu | OBC | Upto Primary |
| 55 | 45-60 | Female | Urban | Non-hindu | OBC | Upto Primary |
| 73 | >60 | Female | Rural | Hindu | SC/ST | Upto Primary |

| | | | | | | |
|---|---|---|---|---|---|---|
| 67 | >60 | Male | Urban | Hindu | OBC | Graduate & above |
| 54 | >60 | Male | Urban | Hindu | OBC | Upto intermediate |
| 57 | >60 | Female | Urban | Non-hindu | OBC | Upto intermediate |
| 48 | >60 | Female | Urban | Non-hindu | OBC | Graduate & above |
| 59 | >60 | Female | Urban | Non-hindu | OBC | Upto Primary |
| 62 | >60 | Female | Urban | Non-hindu | OBC | Upto intermediate |
| 57 | >60 | Male | Urban | Hindu | General | Upto intermediate |
| 55 | >60 | Female | Urban | Non-hindu | General | Upto intermediate |
| 72 | >60 | Male | Urban | Hindu | General | Upto intermediate |
| 73 | >60 | Male | Urban | Hindu | General | Upto Primary |
| 40 | >60 | Female | Urban | Hindu | General | Upto intermediate |
| 38 | >60 | Female | Urban | Hindu | General | Upto intermediate |
| 37 | >60 | Female | Urban | Hindu | OBC | Graduate & above |
| 63 | >60 | Female | Urban | Non-hindu | OBC | Upto Primary |
| 56 | >60 | Male | Urban | Hindu | General | Upto intermediate |
| 62 | >60 | Male | Urban | Hindu | General | Upto intermediate |
| 52 | >60 | Male | Urban | Hindu | OBC | Upto intermediate |
| 54 | >60 | Male | Urban | Hindu | OBC | Upto intermediate |
| 68 | >60 | Male | Urban | Hindu | General | Upto intermediate |
| 45 | >60 | Male | Urban | Hindu | General | Graduate & above |
| 50 | >60 | Female | Urban | Non-hindu | OBC | Graduate & above |
| 51 | 45-60 | Female | Urban | Hindu | OBC | Upto Primary |
| 69 | >60 | Male | Urban | Non-hindu | General | Upto intermediate |
| 47 | 45-60 | Female | Urban | Hindu | General | Graduate & above |
| 45 | 45-60 | Female | Urban | Hindu | OBC | Upto intermediate |
| 47 | 45-60 | Female | Urban | Hindu | OBC | Graduate & above |
| 45 | 45-60 | Female | Urban | Hindu | OBC | Upto intermediate |
| 58 | 45-60 | Male | Urban | Hindu | OBC | Upto intermediate |
| 58 | 45-60 | Female | Urban | Hindu | OBC | Upto Primary |
| 66 | >60 | Male | Urban | Non-hindu | OBC | Upto Primary |
| 58 | 45-60 | Female | Urban | Non-hindu | OBC | Upto Primary |
| 50 | 45-60 | Male | Urban | Hindu | OBC | Upto intermediate |
| 53 | 45-60 | Female | Urban | Hindu | OBC | Upto Primary |
| 43 | >60 | Female | Rural | Hindu | OBC | Upto Primary |
| 35 | <45 | Female | Urban | Hindu | OBC | Graduate & above |
| 32 | <45 | Male | Urban | Hindu | OBC | Graduate & above |
| 42 | <45 | Female | Urban | Hindu | OBC | Graduate & above |
| 43 | <45 | Female | Urban | Hindu | OBC | Upto intermediate |
| 68 | >60 | Male | Urban | Hindu | OBC | Upto intermediate |
| 64 | >60 | Male | Urban | Hindu | OBC | Upto intermediate |
| 78 | >60 | Male | Urban | Hindu | OBC | Upto Primary |
| 50 | 45-60 | Male | Urban | Hindu | OBC | Graduate & above |
| 47 | 45-60 | Female | Urban | Hindu | General | Upto intermediate |
| 60 | 45-60 | Female | Urban | Hindu | OBC | Upto Primary |
| 39 | <45 | Female | Urban | Hindu | OBC | Graduate & above |
| 69 | >60 | Male | Urban | Hindu | General | Upto Primary |
| 50 | 45-60 | Male | Urban | Hindu | OBC | Upto intermediate |
| 52 | 45-60 | Male | Urban | Hindu | OBC | Upto intermediate |
| 66 | >60 | Male | Urban | Hindu | OBC | Upto Primary |
| 55 | 45-60 | Female | Urban | Hindu | OBC | Upto intermediate |

| Occupation | Monthly income | Family history of diabetes | Duration of diabetes ( |
|---|---|---|---|
| Self employed/Pvt. Sector | 10,000 - 50,000 Rs | Yes | 10 |
| Unemployed/Homemaker/Retired | >50,000 Rs | No | 13 |
| Self employed/Pvt. Sector | >50,000 Rs | Yes | 10 |
| Self employed/Pvt. Sector | < 10,000 Rs | Yes | 12 |
| Unemployed/Homemaker/Retired | >50,000 Rs | No | 10 |
| Unemployed/Homemaker/Retired | >50,000 Rs | Yes | 1 |
| Unemployed/Homemaker/Retired | < 10,000 Rs | Yes | 13 |
| Unemployed/Homemaker/Retired | < 10,000 Rs | No | 4 |
| Self employed/Pvt. Sector | 10,000 - 50,000 Rs | No | 2 |
| Self employed/Pvt. Sector | 10,000 - 50,000 Rs | No | 9 |
| Unemployed/Homemaker/Retired | < 10,000 Rs | No | 2 |
| Unemployed/Homemaker/Retired | < 10,000 Rs | No | 23 |
| Unemployed/Homemaker/Retired | < 10,000 Rs | Yes | 18 |
| Unemployed/Homemaker/Retired | < 10,000 Rs | No | 15 |
| Self employed/Pvt. Sector | 10,000 - 50,000 Rs | No | 10 |
| Unemployed/Homemaker/Retired | < 10,000 Rs | Yes | 8 |
| Self employed/Pvt. Sector | 10,000 - 50,000 Rs | Yes | 2 |
| Govt. sector | 10,000 - 50,000 Rs | Yes | 4 |
| Self employed/Pvt. Sector | < 10,000 Rs | Yes | 6 |
| Unemployed/Homemaker/Retired | < 10,000 Rs | Yes | 12 |
| Self employed/Pvt. Sector | 10,000 - 50,000 Rs | Yes | 7 |
| Unemployed/Homemaker/Retired | < 10,000 Rs | Yes | 20 |
| Unemployed/Homemaker/Retired | < 10,000 Rs | Yes | 15 |
| Unemployed/Homemaker/Retired | < 10,000 Rs | No | 16 |
| Unemployed/Homemaker/Retired | < 10,000 Rs | Yes | 30 |
| Unemployed/Homemaker/Retired | 10,000 - 50,000 Rs | Yes | 15 |
| Unemployed/Homemaker/Retired | < 10,000 Rs | No | 12 |
| Unemployed/Homemaker/Retired | < 10,000 Rs | Yes | 12 |
| Self employed/Pvt. Sector | >50,000 Rs | No | 3 |
| Unemployed/Homemaker/Retired | < 10,000 Rs | No | 10 |
| Unemployed/Homemaker/Retired | 10,000 - 50,000 Rs | No | 25 |
| Self employed/Pvt. Sector | 10,000 - 50,000 Rs | Yes | 24 |
| Unemployed/Homemaker/Retired | < 10,000 Rs | No | 21 |
| Unemployed/Homemaker/Retired | < 10,000 Rs | No | 13 |
| Govt. sector | >50,000 Rs | No | 13 |
| Unemployed/Homemaker/Retired | < 10,000 Rs | Yes | 15 |
| Unemployed/Homemaker/Retired | < 10,000 Rs | No | 7 |
| Unemployed/Homemaker/Retired | 10,000 - 50,000 Rs | No | 24 |
| Self employed/Pvt. Sector | < 10,000 Rs | No | 12 |
| Self employed/Pvt. Sector | < 10,000 Rs | No | 15 |
| Unemployed/Homemaker/Retired | < 10,000 Rs | No | 13 |
| Unemployed/Homemaker/Retired | < 10,000 Rs | Yes | 25 |
| Self employed/Pvt. Sector | 10,000 - 50,000 Rs | No | 19 |
| Self employed/Pvt. Sector | >50,000 Rs | Yes | 15 |
| Govt. sector | >50,000 Rs | No | 10 |
| Unemployed/Homemaker/Retired | < 10,000 Rs | No | 20 |
| Unemployed/Homemaker/Retired | < 10,000 Rs | Yes | 8 |
| Unemployed/Homemaker/Retired | 10,000 - 50,000 Rs | Yes | 11 |
| Unemployed/Homemaker/Retired | < 10,000 Rs | No | 27 |

| | | | |
|---|---|---|---|
| Self employed/Pvt. Sector | 10,000 - 50,000 Rs | Yes | 26 |
| Unemployed/Homemaker/Retired | < 10,000 Rs | Yes | 15 |
| Self employed/Pvt. Sector | >50,000 Rs | No | 5 |
| Govt. sector | >50,000 Rs | Yes | 8 |
| Unemployed/Homemaker/Retired | < 10,000 Rs | No | 5 |
| Self employed/Pvt. Sector | >50,000 Rs | No | 8 |
| Self employed/Pvt. Sector | >50,000 Rs | No | 8 |
| Unemployed/Homemaker/Retired | 10,000 - 50,000 Rs | Yes | 20 |
| Self employed/Pvt. Sector | >50,000 Rs | No | 8 |
| Unemployed/Homemaker/Retired | 10,000 - 50,000 Rs | Yes | 13 |
| Self employed/Pvt. Sector | >50,000 Rs | Yes | 15 |
| Self employed/Pvt. Sector | >50,000 Rs | Yes | 12 |
| Unemployed/Homemaker/Retired | < 10,000 Rs | No | 20 |
| Unemployed/Homemaker/Retired | < 10,000 Rs | No | 10 |
| Unemployed/Homemaker/Retired | < 10,000 Rs | Yes | 5 |
| Unemployed/Homemaker/Retired | < 10,000 Rs | Yes | 20 |
| Unemployed/Homemaker/Retired | < 10,000 Rs | No | 12 |
| Unemployed/Homemaker/Retired | < 10,000 Rs | Yes | 12 |
| Unemployed/Homemaker/Retired | < 10,000 Rs | Yes | 16 |
| Self employed/Pvt. Sector | >50,000 Rs | No | 25 |
| Govt. sector | 10,000 - 50,000 Rs | Yes | 11 |
| Unemployed/Homemaker/Retired | < 10,000 Rs | Yes | 16 |
| Unemployed/Homemaker/Retired | < 10,000 Rs | Yes | 2 |
| Self employed/Pvt. Sector | 10,000 - 50,000 Rs | No | 10 |
| Self employed/Pvt. Sector | < 10,000 Rs | Yes | 3 |
| Govt. sector | >50,000 Rs | No | 3 |
| Self employed/Pvt. Sector | >50,000 Rs | Yes | 8 |
| Govt. sector | >50,000 Rs | Yes | 3 |
| Self employed/Pvt. Sector | 10,000 - 50,000 Rs | Yes | 1 |
| Unemployed/Homemaker/Retired | < 10,000 Rs | No | 12 |
| Unemployed/Homemaker/Retired | < 10,000 Rs | No | 18 |
| Unemployed/Homemaker/Retired | < 10,000 Rs | Yes | 10 |
| Govt. sector | 10,000 - 50,000 Rs | Yes | 5 |
| Unemployed/Homemaker/Retired | < 10,000 Rs | No | 5 |
| Self employed/Pvt. Sector | 10,000 - 50,000 Rs | Yes | 4 |
| Unemployed/Homemaker/Retired | < 10,000 Rs | Yes | 10 |
| Unemployed/Homemaker/Retired | < 10,000 Rs | No | 20 |
| Unemployed/Homemaker/Retired | < 10,000 Rs | Yes | 17 |
| Govt. sector | >50,000 Rs | Yes | 4 |
| Unemployed/Homemaker/Retired | < 10,000 Rs | No | 20 |
| Unemployed/Homemaker/Retired | 10,000 - 50,000 Rs | No | 10 |
| Self employed/Pvt. Sector | 10,000 - 50,000 Rs | Yes | 4 |
| Unemployed/Homemaker/Retired | 10,000 - 50,000 Rs | No | 14 |
| Self employed/Pvt. Sector | >50,000 Rs | Yes | 7 |
| Unemployed/Homemaker/Retired | 10,000 - 50,000 Rs | No | 25 |
| Unemployed/Homemaker/Retired | < 10,000 Rs | No | 11 |
| Self employed/Pvt. Sector | 10,000 - 50,000 Rs | No | 8 |
| Unemployed/Homemaker/Retired | < 10,000 Rs | Yes | 8 |
| Unemployed/Homemaker/Retired | < 10,000 Rs | No | 10 |
| Unemployed/Homemaker/Retired | < 10,000 Rs | No | 13 |

| | | | |
|---|---|---|---|
| Unemployed/Homemaker/Retired | 10,000 - 50,000 Rs | Yes | 27 |
| Self employed/Pvt. Sector | >50,000 Rs | No | 9 |
| Unemployed/Homemaker/Retired | < 10,000 Rs | Yes | 17 |
| Govt. sector | >50,000 Rs | Yes | 10 |
| Unemployed/Homemaker/Retired | < 10,000 Rs | Yes | 14 |
| Unemployed/Homemaker/Retired | < 10,000 Rs | Yes | 17 |
| Self employed/Pvt. Sector | >50,000 Rs | No | 15 |
| Unemployed/Homemaker/Retired | < 10,000 Rs | Yes | 15 |
| Unemployed/Homemaker/Retired | < 10,000 Rs | No | 17 |
| Unemployed/Homemaker/Retired | < 10,000 Rs | No | 23 |
| Unemployed/Homemaker/Retired | < 10,000 Rs | Yes | 10 |
| Govt. sector | 10,000 - 50,000 Rs | Yes | 8 |
| Self employed/Pvt. Sector | 10,000 - 50,000 Rs | Yes | 5 |
| Unemployed/Homemaker/Retired | < 10,000 Rs | No | 10 |
| Self employed/Pvt. Sector | 10,000 - 50,000 Rs | No | 16 |
| Self employed/Pvt. Sector | 10,000 - 50,000 Rs | Yes | 12 |
| Govt. sector | 10,000 - 50,000 Rs | No | 7 |
| Self employed/Pvt. Sector | 10,000 - 50,000 Rs | No | 9 |
| Self employed/Pvt. Sector | 10,000 - 50,000 Rs | No | 18 |
| Self employed/Pvt. Sector | >50,000 Rs | Yes | 10 |
| Govt. sector | 10,000 - 50,000 Rs | Yes | 3 |
| Unemployed/Homemaker/Retired | < 10,000 Rs | No | 3 |
| Self employed/Pvt. Sector | 10,000 - 50,000 Rs | No | 12 |
| Self employed/Pvt. Sector | 10,000 - 50,000 Rs | Yes | 12 |
| Unemployed/Homemaker/Retired | < 10,000 Rs | Yes | 3 |
| Unemployed/Homemaker/Retired | < 10,000 Rs | Yes | 2 |
| Unemployed/Homemaker/Retired | < 10,000 Rs | No | 3 |
| Self employed/Pvt. Sector | >50,000 Rs | No | 13 |
| Unemployed/Homemaker/Retired | < 10,000 Rs | No | 5 |
| Unemployed/Homemaker/Retired | < 10,000 Rs | No | 16 |
| Self employed/Pvt. Sector | 10,000 - 50,000 Rs | No | 12 |
| Govt. sector | 10,000 - 50,000 Rs | No | 10 |
| Unemployed/Homemaker/Retired | < 10,000 Rs | No | 2 |
| Unemployed/Homemaker/Retired | < 10,000 Rs | Yes | 8 |
| Self employed/Pvt. Sector | >50,000 Rs | Yes | 5 |
| Govt. sector | 10,000 - 50,000 Rs | No | 2 |
| Unemployed/Homemaker/Retired | < 10,000 Rs | No | 10 |
| Unemployed/Homemaker/Retired | 10,000 - 50,000 Rs | Yes | 11 |
| Unemployed/Homemaker/Retired | < 10,000 Rs | No | 14 |
| Unemployed/Homemaker/Retired | 10,000 - 50,000 Rs | No | 14 |
| Unemployed/Homemaker/Retired | < 10,000 Rs | No | 23 |
| Self employed/Pvt. Sector | >50,000 Rs | Yes | 10 |
| Unemployed/Homemaker/Retired | < 10,000 Rs | No | 7 |
| Unemployed/Homemaker/Retired | < 10,000 Rs | No | 5 |
| Self employed/Pvt. Sector | 10,000 - 50,000 Rs | Yes | 6 |
| Unemployed/Homemaker/Retired | 10,000 - 50,000 Rs | Yes | 24 |
| Govt. sector | 10,000 - 50,000 Rs | Yes | 10 |
| Govt. sector | >50,000 Rs | No | 7 |
| Self employed/Pvt. Sector | 10,000 - 50,000 Rs | No | 10 |
| Unemployed/Homemaker/Retired | < 10,000 Rs | No | 5 |

| Duration of insulin use (y | Number of comorbidities | On HTN medication | Injection device |
|---|---|---|---|
| 0.5 | ≥2 | Yes | Syringe |
| 10 | ≥2 | Yes | Pen |
| 0.5 | 1 | Yes | Pen |
| 8 | ≥2 | Yes | Syringe |
| 1 | 1 | No | Pen |
| 0.5 | ≥2 | Yes | Pen |
| 1.5 | 1 | Yes | Syringe |
| 2.5 | None | Yes | Pen |
| 0.5 | None | Yes | Pen |
| 0.666666667 | 1 | No | Syringe |
| 0.5 | None | No | Syringe |
| 1 | 1 | No | Pen |
| 1 | 1 | No | Pen |
| 1 | 1 | Yes | Pen |
| 10 | None | Yes | Pen |
| 3 | 1 | Yes | Pen |
| 1 | None | Yes | Pen |
| 1 | 1 | Yes | Pen |
| 4.666666667 | None | No | Syringe |
| 0.5 | None | No | Pen |
| 5 | None | No | Syringe |
| 6 | 1 | No | Pen |
| 15 | 1 | No | Pen |
| 6 | ≥2 | No | Pen |
| 10 | ≥2 | No | Pen |
| 5 | None | No | Syringe |
| 4 | 1 | No | Pen |
| 3 | 1 | No | Pen |
| 4 | 1 | Yes | Syringe |
| 2 | 1 | Yes | Pen |
| 10 | 1 | No | Syringe |
| 4 | None | No | Syringe |
| 4 | 1 | No | Pen |
| 3 | ≥2 | Yes | Syringe |
| 1 | 1 | Yes | Pen |
| 3 | 1 | No | Pen |
| 2 | None | No | Pen |
| 5 | 1 | Yes | Syringe |
| 1 | 1 | Yes | Pen |
| 1 | 1 | No | Pen |
| 2 | ≥2 | No | Pen |
| 5 | ≥2 | No | Pen |
| 2 | 1 | No | Syringe |
| 2 | 1 | No | Pen |
| 1.5 | None | Yes | Pen |
| 10 | 1 | Yes | Pen |
| 2 | None | Yes | Pen |
| 5 | 1 | Yes | Pen |
| 5 | 1 | Yes | Syringe |

| | | | | |
|---|---|---|---|---|
| 5 | | 1 | No | Pen |
| 3 | | 1 | No | Pen |
| 0.5 | | 1 | No | Pen |
| 1 | ≥2 | | Yes | Pen |
| 1 | | 1 | Yes | Pen |
| 2 | | 1 | No | Pen |
| 2 | | 1 | No | Pen |
| 10 | | 1 | Yes | Pen |
| 1 | | 1 | No | Pen |
| 5 | None | | No | Pen |
| 5 | ≥2 | | No | Syringe |
| 5 | None | | No | Syringe |
| 5 | | 1 | No | Pen |
| 2 | None | | No | Pen |
| 2 | None | | No | Pen |
| 10 | | 1 | No | Pen |
| 5 | ≥2 | | No | Pen |
| 6 | ≥2 | | No | Pen |
| 10 | None | | Yes | Pen |
| 15 | ≥2 | | Yes | Syringe |
| 5 | ≥2 | | No | Pen |
| 8 | | 1 | Yes | Pen |
| 1 | | 1 | Yes | Syringe |
| 1 | None | | No | Pen |
| 0.833333333 | None | | No | Pen |
| 0.5 | None | | Yes | Pen |
| 2 | ≥2 | | No | Pen |
| 1 | None | | No | Syringe |
| 0.5 | None | | Yes | Syringe |
| 2 | None | | Yes | Syringe |
| 2 | | 1 | No | Syringe |
| 1 | | 1 | No | Syringe |
| 0.5 | None | | No | Pen |
| 1 | None | | No | Pen |
| 1 | None | | No | Pen |
| 1 | ≥2 | | No | Pen |
| 1 | None | | No | Syringe |
| 1 | ≥2 | | No | Pen |
| 0.5 | | 1 | No | Syringe |
| 1.5 | | 1 | No | Syringe |
| 1 | | 1 | No | Pen |
| 0.5 | None | | No | Pen |
| 1 | | 1 | No | Pen |
| 0.5 | None | | No | Pen |
| 2 | | 1 | Yes | Pen |
| 1 | | 1 | Yes | Pen |
| 0.5 | None | | Yes | Pen |
| 0.5 | | 1 | Yes | Pen |
| 1 | | 1 | Yes | Syringe |
| 2 | ≥2 | | Yes | Syringe |

| | | | |
|---|---|---|---|
| 2 | None | Yes | Syringe |
| 1 | None | Yes | Pen |
| 1 | ≥2 | Yes | Syringe |
| 0.5 | None | Yes | Pen |
| 2 | ≥2 | Yes | Syringe |
| 5 | ≥2 | Yes | Pen |
| 0.5 | | 1 Yes | Pen |
| 0.5 | | 1 Yes | Pen |
| 1 | ≥2 | Yes | Syringe |
| 1 | None | Yes | Pen |
| 0.5 | None | Yes | Pen |
| 0.5 | | 1 Yes | Pen |
| 0.5 | None | Yes | Pen |
| 2 | ≥2 | Yes | Syringe |
| 1 | | 1 Yes | Pen |
| 2 | | 1 Yes | Pen |
| 1 | None | Yes | Pen |
| 1 | | 1 Yes | Pen |
| 2 | None | Yes | Pen |
| 1 | ≥2 | Yes | Pen |
| 0.5 | None | Yes | Pen |
| 0.5 | None | Yes | Pen |
| 4 | ≥2 | Yes | Syringe |
| 4 | | 1 Yes | Syringe |
| 0.5 | | 1 Yes | Pen |
| 1 | None | Yes | Pen |
| 0.5 | None | Yes | Pen |
| 2 | | 1 Yes | Pen |
| 0.5 | | 1 Yes | Pen |
| 4 | None | Yes | Syringe |
| 3 | None | Yes | Syringe |
| 2 | None | Yes | Syringe |
| 1 | None | Yes | Pen |
| 0.5 | | 1 No | Pen |
| 0.5 | None | Yes | Pen |
| 0.5 | None | Yes | Pen |
| 1 | | 1 Yes | Pen |
| 0.5 | | 1 Yes | Pen |
| 2 | None | Yes | Syringe |
| 3 | | 1 Yes | Syringe |
| 5 | | 1 No | Syringe |
| 1 | | 1 No | Pen |
| 1 | | 1 No | Pen |
| 0.5 | | 1 No | Syringe |
| 0.5 | | 1 Yes | Pen |
| 10 | | 1 Yes | Syringe |
| 3 | | 1 Yes | Pen |
| 0.5 | | 1 Yes | Pen |
| 3 | None | No | Pen |
| 0.5 | None | Yes | Pen |

| Total daily injections | Type Insulin being use | Dependenc | Concern re | Disruption | Perceived h | Necessity fo |
|---|---|---|---|---|---|---|
| ≤2 | Lantus | Disagree | Disagree | Uncertain | Agree | Disagree |
| ≤2 | Mixtard | Agree | Strongly Di | Agree | Disagree | Agree |
| ≤2 | Lantus | Strongly ag | Strongly Di | Disagree | Disagree | Agree |
| >2 | Regular + Lantus | Strongly ag | Disagree | Agree | Disagree | Strongly ag |
| ≤2 | Mixtard | Uncertain | Uncertain | Uncertain | Disagree | Uncertain |
| >2 | Regular + Lantus | Strongly ag | Strongly Di | Strongly ag | Disagree | Strongly ag |
| ≤2 | Lantus | Agree | Strongly ag | Agree | Disagree | Agree |
| ≤2 | Mixtard | Strongly ag | Agree | Disagree | Strongly ag | Strongly ag |
| ≤2 | Lantus | Uncertain | Agree | Uncertain | Uncertain | Strongly ag |
| ≤2 | Lantus | Agree | Agree | Agree | Agree | Strongly ag |
| ≤2 | Lantus | Agree | Agree | Strongly dis | Uncertain | Agree |
| >2 | Regular + Lantus | Agree | Disagree | Agree | Disagree | Agree |
| ≤2 | Mixtard | Agree | Strongly Di | Disagree | Disagree | Agree |
| ≤2 | Lantus | Agree | Disagree | Agree | Strongly ag | Strongly ag |
| ≤2 | Lantus | Agree | Strongly Di | Disagree | Disagree | Agree |
| >2 | Regular + Lantus | Uncertain | Disagree | Agree | Disagree | Agree |
| ≤2 | Lantus | Disagree | Uncertain | Agree | Uncertain | Uncertain |
| >2 | Regular + Lantus | Agree | Uncertain | Uncertain | Disagree | Agree |
| >2 | Regular + Lantus | Agree | Strongly Di | Uncertain | Disagree | Agree |
| ≤2 | Lantus | Agree | Disagree | Strongly dis | Disagree | Agree |
| ≤2 | Mixtard | Strongly ag | Strongly Di | Disagree | Strongly dis | Strongly ag |
| ≤2 | Mixtard | Strongly ag | Strongly Di | Disagree | Strongly dis | Strongly ag |
| >2 | Regular + Lantus | Strongly ag | Strongly Di | Agree | Strongly dis | Strongly ag |
| ≤2 | Mixtard | Strongly ag | Strongly Di | Strongly dis | Strongly dis | Agree |
| >2 | Regular + Lantus | Strongly ag | Strongly Di | Uncertain | Disagree | Agree |
| ≤2 | Mixtard | Strongly ag | Strongly Di | Disagree | Disagree | Agree |
| ≤2 | Mixtard | Agree | Strongly Di | Strongly dis | Uncertain | Agree |
| ≤2 | Mixtard | Agree | Strongly Di | Strongly dis | Disagree | Agree |
| ≤2 | Mixtard | Agree | Strongly Di | Disagree | Disagree | Agree |
| ≤2 | Lantus | Uncertain | Disagree | Agree | Uncertain | Uncertain |
| ≤2 | Mixtard | Strongly ag | Strongly Di | Strongly dis | Strongly dis | Agree |
| ≤2 | Lantus | Agree | Strongly Di | Disagree | Agree | Agree |
| ≤2 | Mixtard | Strongly ag | Strongly Di | Strongly dis | Strongly dis | Strongly ag |
| ≤2 | Lantus | Agree | Strongly Di | Strongly dis | Strongly dis | Agree |
| ≤2 | Mixtard | Agree | Disagree | Disagree | Disagree | Agree |
| ≤2 | Lantus | Agree | Strongly Di | Disagree | Disagree | Agree |
| >2 | Regular + Lantus | Agree | Strongly Di | Agree | Uncertain | Agree |
| ≤2 | Mixtard | Agree | Strongly Di | Strongly ag | Strongly dis | Strongly ag |
| ≤2 | Mixtard | Uncertain | Strongly Di | Agree | Uncertain | Agree |
| ≤2 | Mixtard | Uncertain | Strongly Di | Agree | Uncertain | Uncertain |
| ≤2 | Mixtard | Agree | Strongly Di | Strongly ag | Disagree | Agree |
| >2 | Regular + Lantus | Agree | Strongly Di | Strongly ag | Strongly dis | Agree |
| ≤2 | Lantus | Agree | Strongly Di | Strongly dis | Strongly dis | Agree |
| >2 | Regular + Lantus | Agree | Disagree | Agree | Uncertain | Agree |
| ≤2 | Mixtard | Strongly ag | Strongly Di | Strongly ag | Strongly dis | Strongly ag |
| >2 | Regular + Lantus | Strongly ag | Disagree | Disagree | Strongly dis | Agree |
| ≤2 | Mixtard | Agree | Strongly Di | Strongly ag | Strongly dis | Agree |
| ≤2 | Mixtard | Strongly ag | Strongly Di | Disagree | Strongly dis | Strongly ag |
| ≤2 | Lantus | Agree | Strongly Di | Disagree | Strongly dis | Agree |

| | | | | | | |
|---|---|---|---|---|---|---|
| ≤2 | Mixtard | Strongly ag | Strongly Di | Strongly dis | Strongly dis | Agree |
| ≤2 | Mixtard | Strongly ag | Strongly Di | Disagree | Strongly dis | Strongly ag |
| ≤2 | Mixtard | Uncertain | Disagree | Strongly ag | Disagree | Uncertain |
| ≤2 | Mixtard | Uncertain | Strongly Di | Disagree | Disagree | Agree |
| ≤2 | Mixtard | Agree | Strongly Di | Disagree | Disagree | Agree |
| ≤2 | Mixtard | Agree | Strongly Di | Disagree | Strongly dis | Agree |
| >2 | Regular + Lantus | Agree | Strongly Di | Strongly dis | Strongly dis | Agree |
| ≤2 | Mixtard | Strongly ag | Strongly Di | Strongly dis | Strongly dis | Strongly ag |
| ≤2 | Lantus | Uncertain | Disagree | Disagree | Disagree | Uncertain |
| ≤2 | Mixtard | Uncertain | Disagree | Strongly dis | Strongly dis | Uncertain |
| >2 | Regular + Lantus | Uncertain | Disagree | Disagree | Uncertain | Uncertain |
| ≤2 | Mixtard | Agree | Strongly Di | Strongly dis | Strongly dis | Agree |
| ≤2 | Mixtard | Agree | Strongly Di | Strongly dis | Strongly dis | Agree |
| ≤2 | Lantus | Uncertain | Strongly Di | Strongly dis | Strongly dis | Uncertain |
| >2 | Regular + Lantus | Agree | Disagree | Disagree | Disagree | Uncertain |
| ≤2 | Mixtard | Agree | Strongly Di | Strongly dis | Strongly dis | Agree |
| ≤2 | Lantus | Agree | Strongly Di | Strongly dis | Strongly dis | Agree |
| ≤2 | Mixtard | Agree | Strongly Di | Strongly dis | Strongly dis | Agree |
| ≤2 | Mixtard | Strongly ag | Disagree | Disagree | Strongly dis | Agree |
| >2 | Regular + Lantus | Strongly ag | Strongly Di | Strongly dis | Strongly dis | Agree |
| >2 | Regular + Lantus | Agree | Uncertain | Disagree | Strongly dis | Agree |
| ≤2 | Mixtard | Strongly ag | Disagree | Disagree | Disagree | Agree |
| ≤2 | Mixtard | Uncertain | Uncertain | Agree | Uncertain | Agree |
| ≤2 | Lantus | Agree | Strongly Di | Strongly dis | Strongly dis | Agree |
| ≤2 | Mixtard | Strongly ag | Uncertain | Strongly dis | Strongly dis | Strongly ag |
| ≤2 | Lantus | Agree | Uncertain | Uncertain | Strongly dis | Agree |
| ≤2 | Mixtard | Uncertain | Disagree | Agree | Disagree | Uncertain |
| ≤2 | Mixtard | Strongly ag | Agree | Agree | Strongly dis | Strongly ag |
| ≤2 | Lantus | Uncertain | Uncertain | Disagree | Strongly dis | Uncertain |
| >2 | Regular + Lantus | Agree | Strongly Di | Strongly dis | Disagree | Agree |
| ≤2 | Lantus | Agree | Disagree | Disagree | Strongly dis | Agree |
| ≤2 | Mixtard | Uncertain | Strongly Di | Agree | Uncertain | Uncertain |
| ≤2 | Lantus | Agree | Uncertain | Disagree | Strongly dis | Agree |
| ≤2 | Mixtard | Agree | Strongly Di | Strongly dis | Strongly dis | Agree |
| ≤2 | Lantus | Strongly ag | Uncertain | Disagree | Strongly dis | Uncertain |
| ≤2 | Lantus | Uncertain | Uncertain | Agree | Disagree | Uncertain |
| ≤2 | Mixtard | Agree | Strongly Di | Strongly dis | Strongly dis | Agree |
| ≤2 | Lantus | Agree | Strongly Di | Strongly dis | Strongly dis | Agree |
| ≤2 | Lantus | Agree | Uncertain | Agree | Disagree | Agree |
| ≤2 | Mixtard | Agree | Strongly Di | Strongly dis | Strongly dis | Agree |
| ≤2 | Lantus | Agree | Strongly Di | Strongly dis | Strongly dis | Agree |
| ≤2 | Lantus | Agree | Uncertain | Agree | Strongly dis | Agree |
| ≤2 | Lantus | Uncertain | Disagree | Agree | Disagree | Uncertain |
| ≤2 | Lantus | Agree | Disagree | Strongly ag | Strongly dis | Agree |
| ≤2 | Mixtard | Agree | Strongly Di | Disagree | Strongly dis | Agree |
| ≤2 | Lantus | Agree | Disagree | Disagree | Strongly dis | Agree |
| ≤2 | Lantus | Uncertain | Disagree | Disagree | Strongly dis | Agree |
| ≤2 | Lantus | Agree | Strongly Di | Agree | Strongly dis | Agree |
| ≤2 | Mixtard | Uncertain | Strongly Di | Agree | Strongly dis | Agree |
| >2 | Regular + Lantus | Agree | Disagree | Agree | Strongly dis | Agree |

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|---|---|---|---|---|---|---|
| ≤2 | Mixtard | Agree | Strongly Di | Disagree | Strongly dis | Agree |
| ≤2 | Lantus | Uncertain | Strongly Di | Disagree | Strongly dis | Agree |
| ≤2 | Mixtard | Agree | Uncertain | Agree | Disagree | Agree |
| ≤2 | Lantus | Uncertain | Uncertain | Agree | Strongly dis | Agree |
| ≤2 | Mixtard | Strongly ag | Strongly Di | Disagree | Strongly dis | Strongly ag |
| >2 | Regular + Lantus | Strongly ag | Agree | Agree | Strongly dis | Strongly ag |
| ≤2 | Lantus | Uncertain | Uncertain | Strongly dis | Strongly dis | Uncertain |
| ≤2 | Lantus | Agree | Strongly Di | Disagree | Strongly dis | Agree |
| ≤2 | Mixtard | Uncertain | Strongly Di | Disagree | Strongly dis | Uncertain |
| ≤2 | Lantus | Agree | Strongly Di | Strongly dis | Strongly dis | Agree |
| ≤2 | Lantus | Uncertain | Uncertain | Disagree | Disagree | Uncertain |
| ≤2 | Lantus | Uncertain | Disagree | Agree | Disagree | Uncertain |
| ≤2 | Lantus | Agree | Disagree | Agree | Strongly dis | Agree |
| ≤2 | Mixtard | Agree | Strongly Di | Disagree | Strongly dis | Agree |
| ≤2 | Mixtard | Agree | Strongly Di | Disagree | Strongly dis | Agree |
| ≤2 | Mixtard | Uncertain | Strongly Di | Agree | Disagree | Agree |
| ≤2 | Lantus | Agree | Disagree | Agree | Strongly dis | Agree |
| ≤2 | Lantus | Agree | Strongly Di | Disagree | Strongly dis | Agree |
| ≤2 | Lantus | Agree | Strongly Di | Uncertain | Disagree | Agree |
| ≤2 | Mixtard | Agree | Uncertain | Agree | Disagree | Uncertain |
| ≤2 | Lantus | Agree | Uncertain | Agree | Strongly dis | Agree |
| ≤2 | Lantus | Agree | Strongly Di | Disagree | Strongly dis | Agree |
| ≤2 | Mixtard | Uncertain | Uncertain | Agree | Disagree | Agree |
| >2 | Regular + Lantus | Agree | Strongly Di | Agree | Disagree | Agree |
| ≤2 | Mixtard | Agree | Uncertain | Disagree | Disagree | Agree |
| ≤2 | Lantus | Agree | Uncertain | Agree | Agree | Agree |
| ≤2 | Lantus | Agree | Strongly Di | Agree | Strongly dis | Agree |
| ≤2 | Lantus | Agree | Strongly Di | Disagree | Disagree | Agree |
| ≤2 | Lantus | Agree | Strongly Di | Disagree | Strongly dis | Agree |
| ≤2 | Mixtard | Agree | Strongly Di | Disagree | Disagree | Agree |
| ≤2 | Mixtard | Agree | Strongly Di | Agree | Disagree | Agree |
| ≤2 | Mixtard | Agree | Strongly Di | Disagree | Strongly dis | Agree |
| ≤2 | Lantus | Strongly ag | Disagree | Disagree | Strongly dis | Agree |
| ≤2 | Lantus | Agree | Uncertain | Agree | Strongly dis | Agree |
| ≤2 | Lantus | Agree | Uncertain | Disagree | Strongly dis | Agree |
| ≤2 | Lantus | Agree | Strongly Di | Disagree | Strongly dis | Agree |
| >2 | Regular + Lantus | Agree | Strongly Di | Agree | Strongly dis | Agree |
| ≤2 | Mixtard | Strongly ag | Disagree | Agree | Strongly dis | Strongly ag |
| ≤2 | Mixtard | Agree | Strongly Di | Strongly dis | Strongly dis | Agree |
| >2 | Regular + Lantus | Agree | Strongly Di | Disagree | Strongly dis | Agree |
| ≤2 | Mixtard | Uncertain | Uncertain | Disagree | Disagree | Uncertain |
| ≤2 | Mixtard | Uncertain | Disagree | Disagree | Disagree | Agree |
| ≤2 | Mixtard | Agree | Agree | Disagree | Disagree | Agree |
| ≤2 | Mixtard | Agree | Strongly Di | Disagree | Disagree | Agree |
| ≤2 | Lantus | Agree | Uncertain | Agree | Strongly dis | Agree |
| ≤2 | Mixtard | Agree | Strongly Di | Disagree | Strongly dis | Agree |
| ≤2 | Lantus | Agree | Disagree | Disagree | Strongly dis | Agree |
| ≤2 | Lantus | Uncertain | Uncertain | Disagree | Strongly dis | Uncertain |
| ≤2 | Mixtard | Agree | Strongly Di | Agree | Disagree | Agree |
| ≤2 | Lantus | Agree | Strongly Di | Disagree | Strongly dis | Agree |

| Health insurance c | Family help for insulin use | Injection instructor | Latest injection instruction |
|---|---|---|---|
| No | Yes | General Practitioner | >6 months |
| No | Yes | Diabetes Specialist | <6 months |
| Yes | Yes | Diabetes Specialist | <6 months |
| No | Yes | Diabetes Specialist | <6 months |
| No | Yes | Diabetes Specialist | <6 months |
| No | No | Diabetes Specialist | <6 months |
| No | Yes | Diabetes Specialist | <6 months |
| No | Yes | Diabetes Specialist | <6 months |
| No | Yes | Diabetes Specialist | <6 months |
| No | No | Diabetes Specialist | <6 months |
| No | No | General Practitioner | >6 months |
| No | Yes | Diabetes Specialist | <6 months |
| Yes | No | Diabetes Specialist | <6 months |
| No | No | Diabetes Specialist | <6 months |
| No | Yes | Diabetes Specialist | <6 months |
| No | No | Diabetes Specialist | <6 months |
| No | No | Diabetes Specialist | <6 months |
| No | No | General Practitioner | <6 months |
| Yes | No | General Practitioner | <6 months |
| Yes | No | Diabetes Specialist | <6 months |
| No | No | Diabetes Specialist | <6 months |
| No | No | Diabetes Specialist | <6 months |
| No | No | Diabetes Specialist | <6 months |
| No | No | Diabetes Specialist | <6 months |
| No | No | Diabetes Specialist | <6 months |
| No | No | General Practitioner | <6 months |
| No | No | Diabetes Specialist | <6 months |
| No | No | Diabetes Specialist | <6 months |
| No | No | General Practitioner | <6 months |
| Yes | No | General Practitioner | <6 months |
| No | Yes | General Practitioner | <6 months |
| No | No | General Practitioner | <6 months |
| No | No | General Practitioner | <6 months |
| No | No | General Practitioner | <6 months |
| No | No | General Practitioner | <6 months |
| No | No | General Practitioner | <6 months |
| Yes | No | General Practitioner | <6 months |
| No | Yes | General Practitioner | <6 months |
| Yes | No | General Practitioner | <6 months |
| Yes | No | General Practitioner | <6 months |
| No | No | General Practitioner | <6 months |
| No | No | General Practitioner | <6 months |
| No | No | General Practitioner | <6 months |
| No | No | General Practitioner | >6 months |
| No | Yes | General Practitioner | <6 months |
| No | Yes | General Practitioner | <6 months |
| Yes | No | General Practitioner | >6 months |
| No | No | General Practitioner | <6 months |
| No | No | General Practitioner | <6 months |

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|---|---|---|---|
| No | No | General Practitioner | <6 months |
| Yes | No | General Practitioner | >6 months |
| No | Yes | Diabetes Specialist | <6 months |
| No | No | General Practitioner | <6 months |
| No | No | Diabetes Specialist | <6 months |
| No | Yes | General Practitioner | <6 months |
| No | Yes | General Practitioner | <6 months |
| No | Yes | General Practitioner | <6 months |
| No | No | Diabetes Specialist | <6 months |
| No | Yes | Diabetes Specialist | <6 months |
| No | No | Diabetes Specialist | <6 months |
| No | No | General Practitioner | <6 months |
| No | No | General Practitioner | <6 months |
| No | No | Diabetes Specialist | <6 months |
| Yes | No | Diabetes Specialist | <6 months |
| No | No | General Practitioner | <6 months |
| No | Yes | General Practitioner | <6 months |
| No | No | General Practitioner | <6 months |
| No | Yes | General Practitioner | <6 months |
| No | No | General Practitioner | <6 months |
| No | No | General Practitioner | <6 months |
| No | Yes | Diabetes Specialist | <6 months |
| No | No | Diabetes Specialist | <6 months |
| No | Yes | General Practitioner | <6 months |
| Yes | No | Diabetes Specialist | >6 months |
| No | Yes | Diabetes Specialist | <6 months |
| No | No | General Practitioner | <6 months |
| No | Yes | Diabetes Specialist | <6 months |
| No | Yes | Diabetes Specialist | <6 months |
| Yes | No | General Practitioner | >6 months |
| Yes | No | General Practitioner | <6 months |
| No | No | General Practitioner | <6 months |
| No | No | Diabetes Specialist | <6 months |
| Yes | No | Diabetes Specialist | <6 months |
| Yes | No | Diabetes Specialist | <6 months |
| No | Yes | Diabetes Specialist | <6 months |
| No | No | General Practitioner | <6 months |
| No | No | General Practitioner | <6 months |
| No | Yes | Diabetes Specialist | <6 months |
| No | No | General Practitioner | <6 months |
| No | No | Diabetes Specialist | <6 months |
| No | No | Diabetes Specialist | <6 months |
| No | No | General Practitioner | <6 months |
| No | No | Diabetes Specialist | <6 months |
| No | Yes | General Practitioner | <6 months |
| No | No | General Practitioner | <6 months |
| No | No | Diabetes Specialist | <6 months |
| Yes | No | General Practitioner | <6 months |
| Yes | No | General Practitioner | <6 months |
| No | No | General Practitioner | >6 months |

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|---|---|---|---|
| No | No | General Practitioner | <6 months |
| No | No | Diabetes Specialist | <6 months |
| No | No | Diabetes Specialist | <6 months |
| No | No | Diabetes Specialist | <6 months |
| No | No | Diabetes Specialist | <6 months |
| No | No | Diabetes Specialist | <6 months |
| No | No | General Practitioner | <6 months |
| No | No | Diabetes Specialist | <6 months |
| No | No | General Practitioner | <6 months |
| No | No | Diabetes Specialist | <6 months |
| No | No | General Practitioner | <6 months |
| No | No | Diabetes Specialist | <6 months |
| No | No | Diabetes Specialist | <6 months |
| Yes | No | Diabetes Specialist | <6 months |
| No | No | Diabetes Specialist | <6 months |
| No | No | General Practitioner | <6 months |
| No | No | Diabetes Specialist | <6 months |
| No | No | General Practitioner | <6 months |
| No | No | General Practitioner | <6 months |
| No | No | General Practitioner | <6 months |
| No | Yes | Diabetes Specialist | <6 months |
| Yes | No | Diabetes Specialist | <6 months |
| No | No | General Practitioner | <6 months |
| No | No | General Practitioner | <6 months |
| No | No | Diabetes Specialist | <6 months |
| No | No | Diabetes Specialist | <6 months |
| No | No | Diabetes Specialist | <6 months |
| No | No | Diabetes Specialist | <6 months |
| No | No | General Practitioner | <6 months |
| Yes | No | General Practitioner | <6 months |
| No | No | Diabetes Specialist | <6 months |
| No | No | General Practitioner | <6 months |
| No | No | General Practitioner | <6 months |
| No | No | General Practitioner | <6 months |
| No | No | Diabetes Specialist | <6 months |
| No | No | Diabetes Specialist | <6 months |
| No | No | Diabetes Specialist | <6 months |
| No | No | Diabetes Specialist | <6 months |
| Yes | No | General Practitioner | <6 months |
| No | Yes | General Practitioner | <6 months |
| No | No | General Practitioner | <6 months |
| No | No | Diabetes Specialist | <6 months |
| No | No | Diabetes Specialist | <6 months |
| Yes | No | General Practitioner | <6 months |
| No | No | Diabetes Specialist | <6 months |
| No | No | General Practitioner | <6 months |
| No | No | General Practitioner | <6 months |
| No | No | Diabetes Specialist | <6 months |
| No | No | General Practitioner | >6 months |
| Yes | No | Diabetes Specialist | <6 months |

| Insulin source | Perceived degree of pain during | Bleeding from injection site |
|---|---|---|
| Nearby medical store | Discomfort | Sometimes |
| Treating hospital | Discomfort | Rarely |
| Treating hospital | Mild Discomfort | Rarely |
| Treating hospital | Mild Discomfort | Rarely |
| Treating hospital | Mild Discomfort | Sometimes |
| Nearby medical store | Painful | Never |
| Treating hospital | Mild Discomfort | Sometimes |
| Treating hospital | Mild Discomfort | Never |
| Nearby medical store | Mild Discomfort | Sometimes |
| Treating hospital | Painful | Rarely |
| Nearby medical store | Painful | Sometimes |
| Nearby medical store | Mild Discomfort | Rarely |
| Treating hospital | Discomfort | Never |
| Treating hospital | Discomfort | Rarely |
| Nearby medical store | Discomfort | Never |
| Nearby medical store | Discomfort | Never |
| Treating hospital | Painful | Rarely |
| Treating hospital | Painful | Never |
| Nearby medical store | Discomfort | Never |
| Treating hospital | Painful | Never |
| Nearby medical store | Painful | Rarely |
| Treating hospital | Painful | Never |
| Treating hospital | Painful | Rarely |
| Nearby medical store | Discomfort | Never |
| Treating hospital | Discomfort | Never |
| Treating hospital | Discomfort | Never |
| Treating hospital | Painful | Never |
| Nearby medical store | Discomfort | Never |
| Nearby medical store | Painful | Rarely |
| Treating hospital | Painful | Rarely |
| Nearby medical store | Mild Discomfort | Never |
| Treating hospital | Discomfort | Never |
| Treating hospital | Painful | Rarely |
| Nearby medical store | Discomfort | Never |
| Treating hospital | Painful | Rarely |
| Treating hospital | Discomfort | Never |
| Treating hospital | Painful | Rarely |
| Nearby medical store | Mild Discomfort | Never |
| Treating hospital | Discomfort | Rarely |
| Treating hospital | Discomfort | Rarely |
| Treating hospital | Painful | Rarely |
| Treating hospital | Painful | Rarely |
| Nearby medical store | Mild Discomfort | Never |
| Treating hospital | Discomfort | Rarely |
| Treating hospital | Painful | Never |
| Nearby medical store | Discomfort | Never |
| Treating hospital | Painful | Rarely |
| Nearby medical store | Discomfort | Never |
| Treating hospital | Discomfort | Rarely |

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|---|---|---|
| Treating hospital | Painful | Rarely |
| Treating hospital | Painful | Rarely |
| Treating hospital | Painful | Never |
| Nearby medical store | Discomfort | Rarely |
| Nearby medical store | Painful | Rarely |
| Nearby medical store | Discomfort | Never |
| Nearby medical store | Discomfort | Never |
| Nearby medical store | Mild Discomfort | Never |
| Nearby medical store | Painful | Rarely |
| Treating hospital | Discomfort | Never |
| Treating hospital | Painful | Rarely |
| Nearby medical store | Mild Discomfort | Never |
| Treating hospital | Discomfort | Never |
| Treating hospital | Painful | Rarely |
| Treating hospital | Painful | Rarely |
| Treating hospital | Mild Discomfort | Never |
| Nearby medical store | Mild Discomfort | Never |
| Nearby medical store | Discomfort | Never |
| Nearby medical store | Discomfort | Never |
| Treating hospital | Discomfort | Never |
| Treating hospital | Discomfort | Never |
| Treating hospital | Mild Discomfort | Never |
| Nearby medical store | Discomfort | Rarely |
| Treating hospital | Mild Discomfort | Never |
| Treating hospital | Discomfort | Sometimes |
| Nearby medical store | Painful | Never |
| Treating hospital | Mild Discomfort | Rarely |
| Treating hospital | Painful | Rarely |
| Treating hospital | Painful | Rarely |
| Treating hospital | Discomfort | Rarely |
| Treating hospital | Discomfort | Never |
| Treating hospital | Painful | Rarely |
| Nearby medical store | Painful | Never |
| Nearby medical store | Discomfort | Never |
| Treating hospital | Painful | Rarely |
| Treating hospital | Painful | Rarely |
| Treating hospital | Mild Discomfort | Never |
| Treating hospital | Discomfort | Never |
| Nearby medical store | Painful | Rarely |
| Treating hospital | Mild Discomfort | Never |
| Nearby medical store | Discomfort | Never |
| Nearby medical store | Painful | Rarely |
| Nearby medical store | Discomfort | Rarely |
| Treating hospital | Discomfort | Never |
| Treating hospital | Mild Discomfort | Never |
| Treating hospital | Discomfort | Rarely |
| Nearby medical store | Painful | Rarely |
| Treating hospital | Painful | Rarely |
| Treating hospital | Painful | Rarely |
| Treating hospital | Mild Discomfort | Never |

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|---|---|---|
| Treating hospital | Mild Discomfort | Never |
| Nearby medical store | Painful | Rarely |
| Nearby medical store | Discomfort | Never |
| Treating hospital | Painful | Never |
| Treating hospital | Discomfort | Never |
| Treating hospital | Mild Discomfort | Never |
| Nearby medical store | Painful | Never |
| Nearby medical store | Mild Discomfort | Never |
| Nearby medical store | Mild Discomfort | Never |
| Treating hospital | Mild Discomfort | Never |
| Nearby medical store | Painful | Rarely |
| Treating hospital | Painful | Rarely |
| Treating hospital | Discomfort | Rarely |
| Treating hospital | Mild Discomfort | Never |
| Nearby medical store | Discomfort | Never |
| Nearby medical store | Discomfort | Rarely |
| Treating hospital | Discomfort | Rarely |
| Treating hospital | Discomfort | Never |
| Nearby medical store | Mild Discomfort | Never |
| Nearby medical store | Discomfort | Rarely |
| Treating hospital | Discomfort | Never |
| Treating hospital | Discomfort | Never |
| Treating hospital | Mild Discomfort | Never |
| Nearby medical store | Mild Discomfort | Never |
| Treating hospital | Discomfort | Never |
| Nearby medical store | Discomfort | Rarely |
| Nearby medical store | Discomfort | Never |
| Nearby medical store | Discomfort | Never |
| Treating hospital | Mild Discomfort | Never |
| Treating hospital | Mild Discomfort | Never |
| Nearby medical store | Mild Discomfort | Never |
| Treating hospital | Discomfort | Rarely |
| Treating hospital | Mild Discomfort | Never |
| Treating hospital | Discomfort | Rarely |
| Nearby medical store | Discomfort | Never |
| Nearby medical store | Discomfort | Rarely |
| Treating hospital | Mild Discomfort | Never |
| Nearby medical store | Discomfort | Rarely |
| Treating hospital | Mild Discomfort | Never |
| Nearby medical store | Mild Discomfort | Never |
| Treating hospital | Mild Discomfort | Never |
| Treating hospital | Discomfort | Sometimes |
| Nearby medical store | Discomfort | Rarely |
| Treating hospital | Discomfort | Rarely |
| Treating hospital | Discomfort | Never |
| Nearby medical store | Mild Discomfort | Never |
| Nearby medical store | Discomfort | Rarely |
| Treating hospital | Discomfort | Never |
| Nearby medical store | Mild Discomfort | Never |
| Nearby medical store | Mild Discomfort | Never |

| Hypoglycemia symptoms | Feeling embarrassed due to insulin |
|---|---|
| Rarely | Often |
| Sometimes | Sometimes |
| Rarely | Often |
| Rarely | Often |
| Sometimes | Rarely |
| Rarely | Often |
| Often | Often |
| Rarely | Often |
| Sometimes | Rarely |
| Rarely | Often |
| Rarely | Sometimes |
| Rarely | Often |
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| Rarely | Often |
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| Rarely | Often |

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| Rarely | Sometimes |
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| Rarely | Sometimes |
| Rarely | Rarely |
| Rarely | Often |
| Rarely | Often |
| Sometimes | Often |
| Rarely | Often |
| Rarely | Often |
| Rarely | Rarely |
| Rarely | Rarely |
| Rarely | Sometimes |
| Rarely | Rarely |
| Rarely | Rarely |
| Rarely | Often |
| Rarely | Often |
| Rarely | Sometimes |
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| Rarely | Rarely |
| Rarely | Often |
| Rarely | Sometimes |
| Rarely | Often |
| Rarely | Sometimes |
| Rarely | Rarely |
| Rarely | Often |
| Rarely | Often |

| Feeling frustrated due to strict schedule | Forgot to ta | Decided no | Refilling ins | Stopping in | Adapting in |
|---|---|---|---|---|---|
| Rarely | Often | Often | Sometimes | Rarely | Rarely |
| Often | Rarely | Rarely | Sometimes | Rarely | Rarely |
| Often | Rarely | Rarely | Often | Often | Rarely |
| Often | Sometimes | Sometimes | Rarely | Rarely | Rarely |
| Often | Rarely | Rarely | Often | Rarely | Often |
| Often | Rarely | Rarely | Often | Rarely | Often |
| Sometimes | Rarely | Rarely | Rarely | Often | Sometimes |
| Often | Often | Often | Rarely | Often | Rarely |
| Rarely | Often | Often | Sometimes | Often | Rarely |
| Rarely | Rarely | Rarely | Sometimes | Often | Rarely |
| Often | Rarely | Rarely | Sometimes | Rarely | Rarely |
| Often | Rarely | Rarely | Sometimes | Rarely | Rarely |
| Often | Rarely | Rarely | Rarely | Rarely | Rarely |
| Sometimes | Rarely | Rarely | Sometimes | Rarely | Rarely |
| Often | Rarely | Rarely | Often | Rarely | Rarely |
| Often | Rarely | Rarely | Rarely | Rarely | Rarely |
| Sometimes | Rarely | Rarely | Often | Rarely | Rarely |
| Often | Rarely | Rarely | Often | Rarely | Rarely |
| Sometimes | Rarely | Sometimes | Sometimes | Rarely | Sometimes |
| Sometimes | Rarely | Rarely | Often | Rarely | Rarely |
| Sometimes | Rarely | Rarely | Often | Rarely | Rarely |
| Often | Rarely | Rarely | Sometimes | Rarely | Rarely |
| Sometimes | Rarely | Rarely | Sometimes | Rarely | Rarely |
| Often | Sometimes | Rarely | Sometimes | Rarely | Rarely |
| Often | Sometimes | Rarely | Rarely | Rarely | Rarely |
| Often | Sometimes | Rarely | Sometimes | Rarely | Rarely |
| Often | Sometimes | Sometimes | Rarely | Rarely | Rarely |
| Often | Rarely | Rarely | Often | Rarely | Rarely |
| Often | Sometimes | Rarely | Often | Rarely | Rarely |
| Often | Sometimes | Rarely | Sometimes | Rarely | Rarely |
| Often | Rarely | Rarely | Often | Rarely | Rarely |
| Often | Rarely | Rarely | Often | Rarely | Rarely |
| Often | Sometimes | Rarely | Sometimes | Rarely | Rarely |
| Often | Sometimes | Rarely | Sometimes | Rarely | Rarely |
| Often | Rarely | Rarely | Often | Rarely | Rarely |
| Often | Sometimes | Rarely | Sometimes | Rarely | Rarely |
| Often | Sometimes | Rarely | Often | Rarely | Rarely |
| Often | Rarely | Rarely | Sometimes | Rarely | Rarely |
| Often | Rarely | Rarely | Often | Rarely | Rarely |
| Often | Rarely | Rarely | Often | Rarely | Rarely |
| Often | Sometimes | Rarely | Sometimes | Often | Rarely |
| Often | Rarely | Rarely | Often | Rarely | Rarely |
| Often | Rarely | Rarely | Often | Often | Rarely |
| Often | Sometimes | Rarely | Sometimes | Often | Rarely |
| Often | Rarely | Rarely | Often | Rarely | Rarely |
| Often | Rarely | Rarely | Often | Rarely | Rarely |
| Often | Sometimes | Rarely | Often | Rarely | Rarely |
| Often | Rarely | Rarely | Often | Rarely | Rarely |
| Often | Rarely | Rarely | Often | Rarely | Rarely |

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|---|---|---|---|---|---|
| Often | Sometimes | Rarely | Often | Rarely | Rarely |
| Often | Sometimes | Rarely | Often | Often | Rarely |
| Often | Rarely | Rarely | Often | Rarely | Rarely |
| Often | Rarely | Rarely | Often | Rarely | Rarely |
| Often | Rarely | Rarely | Often | Rarely | Rarely |
| Often | Sometimes | Rarely | Sometimes | Rarely | Rarely |
| Often | Rarely | Rarely | Often | Rarely | Rarely |
| Often | Sometimes | Sometimes | Sometimes | Rarely | Rarely |
| Often | Rarely | Rarely | Often | Rarely | Rarely |
| Often | Rarely | Rarely | Often | Rarely | Rarely |
| Often | Rarely | Rarely | Often | Rarely | Rarely |
| Often | Sometimes | Rarely | Often | Rarely | Rarely |
| Often | Rarely | Rarely | Often | Rarely | Rarely |
| Often | Rarely | Rarely | Often | Rarely | Rarely |
| Often | Sometimes | Rarely | Often | Rarely | Rarely |
| Often | Rarely | Rarely | Often | Rarely | Sometimes |
| Often | Rarely | Rarely | Often | Rarely | Often |
| Often | Sometimes | Rarely | Sometimes | Rarely | Rarely |
| Often | Rarely | Rarely | Sometimes | Rarely | Sometimes |
| Often | Rarely | Rarely | Often | Rarely | Rarely |
| Often | Rarely | Rarely | Often | Rarely | Rarely |
| Often | Sometimes | Rarely | Sometimes | Rarely | Rarely |
| Often | Rarely | Rarely | Often | Rarely | Rarely |
| Often | Sometimes | Rarely | Sometimes | Rarely | Rarely |
| Often | Rarely | Rarely | Sometimes | Rarely | Rarely |
| Often | Rarely | Rarely | Often | Rarely | Sometimes |
| Often | Rarely | Rarely | Often | Rarely | Rarely |
| Often | Rarely | Rarely | Often | Rarely | Sometimes |
| Sometimes | Rarely | Rarely | Often | Rarely | Rarely |
| Often | Sometimes | Rarely | Sometimes | Rarely | Rarely |
| Often | Rarely | Rarely | Often | Rarely | Sometimes |
| Often | Rarely | Rarely | Often | Rarely | Rarely |
| Often | Rarely | Rarely | Sometimes | Rarely | Rarely |
| Often | Rarely | Rarely | Often | Rarely | Rarely |
| Often | Sometimes | Rarely | Sometimes | Rarely | Rarely |
| Sometimes | Sometimes | Rarely | Sometimes | Rarely | Rarely |
| Often | Sometimes | Rarely | Sometimes | Rarely | Rarely |
| Often | Rarely | Rarely | Often | Rarely | Sometimes |
| Sometimes | Sometimes | Rarely | Often | Rarely | Rarely |
| Often | Sometimes | Rarely | Often | Rarely | Rarely |
| Often | Rarely | Rarely | Often | Rarely | Sometimes |
| Sometimes | Rarely | Rarely | Often | Rarely | Rarely |
| Often | Rarely | Rarely | Often | Rarely | Sometimes |
| Often | Rarely | Rarely | Often | Rarely | Sometimes |
| Often | Rarely | Rarely | Often | Rarely | Sometimes |
| Sometimes | Rarely | Rarely | Often | Rarely | Sometimes |
| Often | Rarely | Rarely | Often | Rarely | Rarely |
| Often | Rarely | Rarely | Sometimes | Rarely | Rarely |
| Sometimes | Rarely | Rarely | Often | Rarely | Sometimes |
| Sometimes | Sometimes | Rarely | Sometimes | Rarely | Rarely |

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|---|---|---|---|---|---|
| Often | Rarely | Rarely | Often | Rarely | Sometimes |
| Often | Rarely | Rarely | Sometimes | Rarely | Rarely |
| Sometimes | Rarely | Rarely | Often | Rarely | Rarely |
| Rarely | Rarely | Rarely | Sometimes | Rarely | Rarely |
| Rarely | Rarely | Rarely | Sometimes | Rarely | Rarely |
| Often | Rarely | Rarely | Often | Rarely | Rarely |
| Often | Rarely | Rarely | Often | Rarely | Rarely |
| Often | Sometimes | Rarely | Often | Rarely | Rarely |
| Often | Rarely | Rarely | Often | Rarely | Rarely |
| Often | Sometimes | Rarely | Often | Rarely | Rarely |
| Sometimes | Rarely | Rarely | Often | Rarely | Sometimes |
| Sometimes | Rarely | Rarely | Often | Rarely | Sometimes |
| Often | Rarely | Rarely | Often | Rarely | Sometimes |
| Often | Rarely | Rarely | Often | Rarely | Sometimes |
| Often | Rarely | Rarely | Often | Rarely | Often |
| Often | Rarely | Rarely | Often | Rarely | Sometimes |
| Often | Rarely | Rarely | Often | Rarely | Sometimes |
| Sometimes | Rarely | Rarely | Often | Rarely | Sometimes |
| Often | Rarely | Rarely | Often | Rarely | Sometimes |
| Sometimes | Rarely | Rarely | Often | Rarely | Sometimes |
| Often | Rarely | Rarely | Often | Rarely | Rarely |
| Often | Rarely | Rarely | Often | Rarely | Sometimes |
| Often | Rarely | Rarely | Sometimes | Rarely | Sometimes |
| Sometimes | Rarely | Rarely | Often | Rarely | Sometimes |
| Often | Sometimes | Rarely | Sometimes | Rarely | Rarely |
| Sometimes | Rarely | Rarely | Sometimes | Rarely | Sometimes |
| Often | Sometimes | Rarely | Sometimes | Rarely | Rarely |
| Often | Rarely | Rarely | Often | Rarely | Sometimes |
| Often | Sometimes | Rarely | Often | Rarely | Sometimes |
| Often | Rarely | Rarely | Often | Rarely | Rarely |
| Sometimes | Rarely | Rarely | Often | Rarely | Sometimes |
| Often | Rarely | Rarely | Often | Rarely | Sometimes |
| Often | | | | | |
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| Often | | | | | |
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| Sometimes | | | | | |
| Sometimes | | | | | |
| Often | | | | | |

| Adjusting tl | Frequency of consuming fruits/vegetables in a week | Current tob | Current alc | Conscious e |
|---|---|---|---|---|
| Sometimes | < 4 days/week | Yes | Yes | Yes |
| Rarely | ≥ 4 days/week | No | No | No |
| Often | < 4 days/week | Yes | Yes | No |
| Rarely | ≥ 4 days/week | Yes | Yes | Yes |
| Often | ≥ 4 days/week | No | No | No |
| Often | ≥ 4 days/week | Yes | No | No |
| Sometimes | ≥ 4 days/week | No | No | No |
| Rarely | ≥ 4 days/week | No | No | No |
| Often | ≥ 4 days/week | No | No | No |
| Rarely | < 4 days/week | Yes | No | No |
| Rarely | ≥ 4 days/week | No | No | Yes |
| Rarely | ≥ 4 days/week | No | No | No |
| Rarely | ≥ 4 days/week | No | No | No |
| Rarely | < 4 days/week | No | No | No |
| Rarely | < 4 days/week | Yes | No | Yes |
| Rarely | < 4 days/week | No | No | No |
| Rarely | < 4 days/week | No | No | No |
| Sometimes | < 4 days/week | Yes | No | No |
| Sometimes | < 4 days/week | No | No | No |
| Often | ≥ 4 days/week | No | No | No |
| Rarely | ≥ 4 days/week | Yes | Yes | No |
| Rarely | ≥ 4 days/week | No | No | No |
| Rarely | ≥ 4 days/week | Yes | No | No |
| Rarely | ≥ 4 days/week | No | No | No |
| Rarely | ≥ 4 days/week | Yes | Yes | No |
| Rarely | < 4 days/week | Yes | Yes | No |
| Rarely | ≥ 4 days/week | Yes | Yes | No |
| Rarely | ≥ 4 days/week | Yes | No | No |
| Rarely | < 4 days/week | No | No | No |
| Rarely | < 4 days/week | No | No | No |
| Rarely | ≥ 4 days/week | No | No | No |
| Rarely | < 4 days/week | No | No | No |
| Sometimes | < 4 days/week | No | No | No |
| Rarely | < 4 days/week | No | Yes | No |
| Rarely | ≥ 4 days/week | No | Yes | No |
| Rarely | < 4 days/week | No | No | No |
| Rarely | < 4 days/week | No | Yes | No |
| Rarely | ≥ 4 days/week | No | Yes | No |
| Rarely | ≥ 4 days/week | Yes | No | No |
| Rarely | ≥ 4 days/week | Yes | Yes | No |
| Rarely | ≥ 4 days/week | No | No | No |
| Rarely | < 4 days/week | No | No | Yes |
| Rarely | < 4 days/week | Yes | No | Yes |
| Rarely | ≥ 4 days/week | No | No | No |
| Rarely | ≥ 4 days/week | No | No | No |
| Rarely | ≥ 4 days/week | No | No | No |
| Rarely | < 4 days/week | No | No | No |
| Rarely | ≥ 4 days/week | No | No | No |
| Often | ≥ 4 days/week | No | No | No |

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|---|---|---|---|---|
| Rarely | < 4 days/week | No | No | No |
| Rarely | ≥ 4 days/week | Yes | No | No |
| Rarely | < 4 days/week | Yes | Yes | No |
| Rarely | < 4 days/week | Yes | No | No |
| Often | ≥ 4 days/week | Yes | No | No |
| Rarely | ≥ 4 days/week | No | No | No |
| Rarely | ≥ 4 days/week | No | No | No |
| Rarely | ≥ 4 days/week | Yes | No | No |
| Often | < 4 days/week | Yes | No | No |
| Often | ≥ 4 days/week | Yes | No | No |
| Rarely | < 4 days/week | No | Yes | No |
| Rarely | ≥ 4 days/week | No | Yes | No |
| Often | < 4 days/week | No | No | No |
| Rarely | < 4 days/week | No | No | No |
| Sometimes | < 4 days/week | No | No | No |
| Often | < 4 days/week | No | No | No |
| Rarely | ≥ 4 days/week | No | No | No |
| Often | < 4 days/week | No | No | No |
| Often | < 4 days/week | No | No | No |
| Often | < 4 days/week | Yes | Yes | No |
| Often | ≥ 4 days/week | No | No | No |
| Sometimes | ≥ 4 days/week | No | No | No |
| Sometimes | ≥ 4 days/week | No | No | No |
| Sometimes | ≥ 4 days/week | No | No | No |
| Sometimes | ≥ 4 days/week | No | No | No |
| Often | < 4 days/week | No | No | No |
| Often | < 4 days/week | Yes | No | No |
| Often | ≥ 4 days/week | No | No | No |
| Sometimes | ≥ 4 days/week | No | Yes | No |
| Sometimes | ≥ 4 days/week | No | No | No |
| Often | ≥ 4 days/week | No | Yes | No |
| Often | ≥ 4 days/week | No | No | No |
| Sometimes | ≥ 4 days/week | No | Yes | No |
| Often | ≥ 4 days/week | No | No | No |
| Sometimes | ≥ 4 days/week | No | No | No |
| Sometimes | ≥ 4 days/week | No | No | No |
| Sometimes | ≥ 4 days/week | No | No | No |
| Often | ≥ 4 days/week | No | No | No |
| Sometimes | ≥ 4 days/week | No | No | No |
| Rarely | ≥ 4 days/week | No | No | No |
| Often | ≥ 4 days/week | No | No | No |
| Often | ≥ 4 days/week | No | No | No |
| Often | ≥ 4 days/week | No | No | No |
| Often | ≥ 4 days/week | No | No | No |
| Often | ≥ 4 days/week | No | No | No |
| Often | ≥ 4 days/week | No | No | No |
| Sometimes | ≥ 4 days/week | No | No | No |
| Often | ≥ 4 days/week | No | No | No |
| Often | < 4 days/week | No | No | No |
| Often | ≥ 4 days/week | No | No | No |

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|---|---|---|---|---|
| Often | ≥ 4 days/week | Yes | No | No |
| Sometimes | ≥ 4 days/week | No | No | No |
| Often | ≥ 4 days/week | No | No | No |
| Often | < 4 days/week | No | No | No |
| Often | < 4 days/week | No | No | No |
| Often | ≥ 4 days/week | No | No | No |
| Often | ≥ 4 days/week | No | No | No |
| Sometimes | ≥ 4 days/week | No | No | No |
| Often | < 4 days/week | No | Yes | No |
| Sometimes | ≥ 4 days/week | No | No | No |
| Often | < 4 days/week | No | No | No |
| Often | ≥ 4 days/week | No | No | No |
| Often | ≥ 4 days/week | No | No | No |
| Often | < 4 days/week | No | No | No |
| Often | ≥ 4 days/week | No | No | No |
| Often | ≥ 4 days/week | No | No | No |
| Often | ≥ 4 days/week | No | No | No |
| Often | ≥ 4 days/week | Yes | No | No |
| Often | ≥ 4 days/week | No | No | No |
| Often | < 4 days/week | No | Yes | No |
| Often | ≥ 4 days/week | No | No | No |
| Often | ≥ 4 days/week | No | No | No |
| Often | ≥ 4 days/week | No | No | No |
| Often | < 4 days/week | No | No | No |
| Sometimes | ≥ 4 days/week | No | No | No |
| Often | ≥ 4 days/week | No | No | No |
| Sometimes | ≥ 4 days/week | No | No | No |
| Often | ≥ 4 days/week | No | No | No |
| Often | ≥ 4 days/week | No | No | No |
| Often | < 4 days/week | No | No | No |
| Often | < 4 days/week | Yes | No | No |
| Sometimes | ≥ 4 days/week | Yes | Yes | No |
| | ≥ 4 days/week | Yes | No | No |
| | ≥ 4 days/week | Yes | No | No |
| | < 4 days/week | No | No | No |
| | ≥ 4 days/week | No | No | No |
| | ≥ 4 days/week | No | No | No |
| | ≥ 4 days/week | No | Yes | No |
| | ≥ 4 days/week | No | Yes | No |
| | ≥ 4 days/week | No | No | No |
| | < 4 days/week | Yes | No | No |
| | < 4 days/week | No | Yes | No |
| | ≥ 4 days/week | No | Yes | No |
| | < 4 days/week | No | Yes | No |
| | < 4 days/week | No | No | No |
| | ≥ 4 days/week | Yes | No | No |
| | ≥ 4 days/week | Yes | No | No |
| | ≥ 4 days/week | No | No | No |
| | ≥ 4 days/week | No | No | No |
| | ≥ 4 days/week | No | No | No |

| I tend to avoid seeing the doctor (diabetes spe | Occasionally I eat lots of swee |
|---|---|
| Agree | Disagree |
| Neutral | Neutral |
| Neutral | Disagree |
| Neutral | Agree |
| Neutral | Disagree |
| Neutral | Disagree |
| Neutral | Neutral |
| Neutral | Disagree |
| Neutral | Agree |
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| Disagree | Disagree |
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| Disagree | Disagree |
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| Neutral | Neutral |
| Neutral | Disagree |

| I check my blood glucose levels frequently enough for achie | I am regularly physically active t | SBP |
|---|---|---|
| Disagree | Disagree | 145 |
| Neutral | Agree | 172 |
| Disagree | Agree | 128 |
| Disagree | Agree | 137 |
| Disagree | Agree | 163 |
| Agree | Agree | 190 |
| Agree | Neutral | 126 |
| Agree | Agree | 122 |
| Agree | Neutral | 124 |
| Disagree | Agree | 138 |
| Neutral | Agree | 122 |
| Neutral | Disagree | 136 |
| Disagree | Disagree | 144 |
| Disagree | Disagree | 155 |
| Disagree | Disagree | 117 |
| Disagree | Disagree | 130 |
| Disagree | Disagree | 126 |
| Disagree | Neutral | 147 |
| Disagree | Disagree | 123 |
| Disagree | Disagree | 149 |
| Disagree | Agree | 98 |
| Neutral | Agree | 159 |
| Agree | Disagree | 119 |
| Disagree | Agree | 145 |
| Disagree | Disagree | 149 |
| Disagree | Disagree | 128 |
| Disagree | Agree | 140 |
| Disagree | Disagree | 145 |
| Disagree | Disagree | 142 |
| Disagree | Agree | 155 |
| Disagree | Disagree | 148 |
| Disagree | Disagree | 126 |
| Disagree | Disagree | 152 |
| Disagree | Disagree | 150 |
| Disagree | Agree | 130 |
| Disagree | Disagree | 142 |
| Disagree | Agree | 122 |
| Disagree | Neutral | 140 |
| Disagree | Agree | 148 |
| Disagree | Agree | 148 |
| Disagree | Disagree | 144 |
| Disagree | Disagree | 148 |
| Disagree | Disagree | 138 |
| Disagree | Disagree | 144 |
| Disagree | Agree | 122 |
| Disagree | Disagree | 144 |
| Disagree | Disagree | 126 |
| Disagree | Disagree | 140 |
| Disagree | Disagree | 138 |

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|---|---|---|
| Disagree | Disagree | 144 |
| Disagree | Agree | 138 |
| Disagree | Agree | 120 |
| Disagree | Agree | 132 |
| Disagree | Disagree | 138 |
| Disagree | Agree | 126 |
| Disagree | Agree | 142 |
| Disagree | Disagree | 138 |
| Disagree | Agree | 142 |
| Disagree | Neutral | 136 |
| Disagree | Disagree | 148 |
| Disagree | Agree | 128 |
| Disagree | Disagree | 144 |
| Disagree | Agree | 124 |
| Disagree | Agree | 126 |
| Disagree | Disagree | 132 |
| Disagree | Neutral | 142 |
| Disagree | Neutral | 138 |
| Disagree | Agree | 172 |
| Disagree | Disagree | 135 |
| Neutral | Agree | 148 |
| Disagree | Agree | 139 |
| Disagree | Agree | 140 |
| Disagree | Disagree | 126 |
| Disagree | Agree | 145 |
| Neutral | Agree | 93 |
| Disagree | Agree | 144 |
| Neutral | Agree | 112 |
| Disagree | Agree | 145 |
| Disagree | Disagree | 128 |
| Disagree | Disagree | 152 |
| Disagree | Disagree | 157 |
| Disagree | Agree | 137 |
| Disagree | Disagree | 140 |
| Disagree | Agree | 122 |
| Neutral | Disagree | 141 |
| Neutral | Agree | 134 |
| Disagree | Disagree | 145 |
| Neutral | Disagree | 114 |
| Neutral | Disagree | 156 |
| Disagree | Agree | 140 |
| Disagree | Agree | 133 |
| Disagree | Disagree | 149 |
| Neutral | Agree | 122 |
| Disagree | Disagree | 127 |
| Disagree | Agree | 128 |
| Disagree | Agree | 131 |
| Disagree | Agree | 180 |
| Disagree | Disagree | 141 |
| Disagree | Disagree | 144 |

| | | |
|---|---|---|
| Neutral | Agree | 126 |
| Disagree | Agree | 127 |
| Disagree | Disagree | 151 |
| Neutral | Agree | 123 |
| Neutral | Agree | 161 |
| Neutral | Disagree | 140 |
| Neutral | Agree | 154 |
| Neutral | Agree | 142 |
| Disagree | Agree | 186 |
| Neutral | Neutral | 138 |
| Disagree | Agree | 160 |
| Neutral | Agree | 146 |
| Neutral | Agree | 122 |
| Disagree | Disagree | 180 |
| Neutral | Disagree | 128 |
| Disagree | Disagree | 148 |
| Disagree | Agree | 121 |
| Disagree | Disagree | 131 |
| Neutral | Disagree | 132 |
| Disagree | Agree | 141 |
| Neutral | Agree | 148 |
| Disagree | Agree | 128 |
| Disagree | Disagree | 163 |
| Disagree | Disagree | 131 |
| Neutral | Agree | 144 |
| Disagree | Agree | 122 |
| Neutral | Agree | 137 |
| Disagree | Agree | 132 |
| Disagree | Agree | 131 |
| Disagree | Disagree | 116 |
| Neutral | Agree | 163 |
| Disagree | Agree | 121 |
| Neutral | Disagree | 121 |
| Neutral | Disagree | 150 |
| Neutral | Agree | 128 |
| Disagree | Agree | 124 |
| Disagree | Agree | 132 |
| Neutral | Agree | 141 |
| Disagree | Disagree | 116 |
| Disagree | Agree | 144 |
| Disagree | Disagree | 156 |
| Disagree | Disagree | 148 |
| Disagree | Agree | 124 |
| Disagree | Disagree | 138 |
| Neutral | Agree | 140 |
| Disagree | Disagree | 142 |
| Disagree | Agree | 128 |
| Neutral | Disagree | 151 |
| Disagree | Disagree | 120 |
| Neutral | Agree | 110 |

| dbp | MAP | Hypertensi | HTN contrc | On HTN me | BMI | BMI catego | s.Creatinin | Creatinine |
|---|---|---|---|---|---|---|---|---|
| 90 | 108.3333 | Hypertensi | Uncontrolle | Yes | 24.4 | Overweight | 0.88 | Normal |
| 64 | 100 | Hypertensi | Uncontrolle | Yes | 20.5 | Normal | 0.86 | Normal |
| 79 | 95.33333 | Pre-hyperte | Controlled | Yes | 26 | Overweight | 0.68 | Normal |
| 93 | 107.6667 | Hypertensi | Uncontrolle | Yes | 22.5 | Normal | 0.88 | Normal |
| 86 | 111.6667 | Hypertensive | | No | 29.38776 | Obese | 0.9 | Normal |
| 100 | 130 | Hypertensi | Uncontrolle | Yes | 26.81359 | Overweight | 0.92 | Normal |
| 85 | 98.66667 | Pre-hyperte | Controlled | Yes | 26.83865 | Overweight | 0.87 | Normal |
| 81 | 94.66667 | Pre-hyperte | Controlled | Yes | 20.28123 | Normal | 0.57 | Normal |
| 88 | 100 | Pre-hyperte | Controlled | Yes | 24.09297 | Overweight | 0.68 | Normal |
| 88 | 104.6667 | Pre-hypertensive | | No | 21.45329 | Normal | 0.66 | Normal |
| 88 | 99.33333 | Pre-hypertensive | | No | 29.43213 | Obese | 0.8 | Normal |
| 74 | 94.66667 | Pre-hypertensive | | No | 29.43213 | Obese | 0.67 | Normal |
| 60 | 88 | Hypertensive | | No | 24.03441 | Overweight | 0.82 | Normal |
| 72 | 99.66667 | Hypertensi | Uncontrolle | Yes | 23.30905 | Overweight | 0.95 | Normal |
| 79 | 91.66667 | Normotens | Controlled | Yes | 18.59012 | Normal | 0.85 | Normal |
| 71 | 90.66667 | Pre-hyperte | Uncontrolle | Yes | 16.02307 | Normal | 1.82 | Abnormal |
| 81 | 96 | Pre-hyperte | Controlled | Yes | 23.67125 | Overweight | 0.88 | Normal |
| 87 | 107 | Hypertensi | Uncontrolle | Yes | 18.75 | Normal | 0.63 | Normal |
| 77 | 92.33333 | Pre-hypertensive | | No | 21.875 | Normal | 1.1 | Normal |
| 86 | 107 | Hypertensive | | No | 29.86496 | Obese | 0.88 | Normal |
| 66 | 76.66667 | Normotensive | | No | 16.76574 | Normal | 0.81 | Normal |
| 78 | 105 | Hypertensive | | No | 21.09375 | Normal | 0.86 | Normal |
| 67 | 84.33333 | Normotensive | | No | 27.34375 | Overweight | 0.69 | Normal |
| 92 | 109.6667 | Hypertensive | | No | 18.6115 | Normal | 0.8 | Normal |
| 94 | 112.3333 | Hypertensive | | No | 22.03173 | Normal | 1 | Normal |
| 72 | 90.66667 | Pre-hypertensive | | No | 27.14158 | Overweight | 1.24 | Abnormal |
| 88 | 105.3333 | Pre-hypertensive | | No | 30.04326 | Obese | 0.6 | Normal |
| 92 | 109.6667 | Hypertensive | | No | 27.47138 | Obese | 1.21 | Abnormal |
| 88 | 106 | Hypertensi | Uncontrolle | Yes | 27.34375 | Overweight | 1.08 | Abnormal |
| 92 | 113 | Hypertensi | Uncontrolle | Yes | 25.71166 | Overweight | 1.21 | Abnormal |
| 90 | 109.3333 | Hypertensive | | No | 22.9854 | Normal | 1.78 | Abnormal |
| 68 | 87.33333 | Pre-hypertensive | | No | 26.92744 | Overweight | 0.9 | Normal |
| 92 | 112 | Hypertensive | | No | 21.48438 | Normal | 0.81 | Normal |
| 94 | 112.6667 | Hypertensi | Uncontrolle | Yes | 26.43807 | Overweight | 1.27 | Abnormal |
| 82 | 98 | Pre-hyperte | Controlled | Yes | 21.46915 | Normal | 0.81 | Normal |
| 90 | 107.3333 | Hypertensive | | No | 24.03461 | Overweight | 0.68 | Normal |
| 88 | 99.33333 | Pre-hypertensive | | No | 17.96875 | Normal | 0.89 | Normal |
| 88 | 105.3333 | Pre-hyperte | Uncontrolle | Yes | 23.87543 | Overweight | 0.72 | Normal |
| 94 | 112 | Hypertensi | Uncontrolle | Yes | 17.83591 | Normal | 0.91 | Normal |
| 94 | 112 | Hypertensive | | No | 17.57707 | Normal | 0.77 | Normal |
| 90 | 108 | Hypertensive | | No | 28.57796 | Obese | 0.82 | Normal |
| 88 | 108 | Hypertensive | | No | 23.19109 | Overweight | 0.88 | Normal |
| 92 | 107.3333 | Hypertensive | | No | 23.66144 | Overweight | 0.82 | Normal |
| 94 | 110.6667 | Hypertensive | | No | 37.37024 | Obese | 0.73 | Normal |
| 88 | 99.33333 | Pre-hyperte | Controlled | Yes | 29.7442 | Obese | 0.66 | Normal |
| 88 | 106.6667 | Hypertensi | Uncontrolle | Yes | 29.77778 | Obese | 0.74 | Normal |
| 88 | 100.6667 | Pre-hyperte | Controlled | Yes | 30.22222 | Obese | 0.68 | Normal |
| 86 | 104 | Pre-hyperte | Uncontrolle | Yes | 26.67487 | Overweight | 0.7 | Normal |
| 90 | 106 | Pre-hyperte | Uncontrolle | Yes | 21.09619 | Normal | 0.77 | Normal |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 92 | 109.3333 | Hypertensive | No | 25.78125 | Overweight | 0.72 | Normal |
| 94 | 108.6667 | Hypertensive | No | 28.88889 | Obese | 0.66 | Normal |
| 78 | 92 | Pre-hypertensive | No | 22.12974 | Normal | 0.68 | Normal |
| 90 | 104 | Pre-hyperte | Uncontrolle | Yes | 31.83391 | Obese | 0.88 | Normal |
| 92 | 107.3333 | Hypertensi | Uncontrolle | Yes | 41.5333 | Obese | 0.9 | Normal |
| 82 | 96.66667 | Pre-hypertensive | No | 17.57707 | Normal | 0.68 | Normal |
| 94 | 110 | Hypertensive | No | 21.46915 | Normal | 0.77 | Normal |
| 90 | 106 | Pre-hyperte | Uncontrolle | Yes | 22.30815 | Normal | 0.82 | Normal |
| 94 | 110 | Hypertensive | No | 25.35154 | Overweight | 0.89 | Normal |
| 88 | 104 | Pre-hypertensive | No | 26.21882 | Overweight | 0.68 | Normal |
| 92 | 110.6667 | Hypertensive | No | 23.38435 | Overweight | 0.68 | Normal |
| 82 | 97.33333 | Pre-hypertensive | No | 28.39373 | Obese | 0.76 | Normal |
| 90 | 108 | Hypertensive | No | 24.60938 | Overweight | 0.88 | Normal |
| 76 | 92 | Pre-hypertensive | No | 28.51563 | Obese | 0.68 | Normal |
| 78 | 94 | Pre-hypertensive | No | 25.03992 | Overweight | 0.8 | Normal |
| 88 | 102.6667 | Pre-hypertensive | No | 24.44444 | Overweight | 0.62 | Normal |
| 86 | 104.6667 | Hypertensive | No | 18.22222 | Normal | 0.68 | Normal |
| 94 | 108.6667 | Hypertensive | No | 23.24341 | Overweight | 1.12 | Abnormal |
| 91 | 118 | Hypertensi | Uncontrolle | Yes | 20.82094 | Normal | 0.56 | Normal |
| 91 | 105.6667 | Hypertensi | Uncontrolle | Yes | 23.87543 | Overweight | 0.66 | Normal |
| 72 | 97.33333 | Hypertensive | No | 24.6755 | Overweight | 1.44 | Abnormal |
| 69 | 92.33333 | Pre-hyperte | Uncontrolle | Yes | 26.5625 | Overweight | 0.68 | Normal |
| 75 | 96.66667 | Pre-hyperte | Uncontrolle | Yes | 26 | Overweight | 1.1 | Abnormal |
| 74 | 91.33333 | Pre-hypertensive | No | 21.96712 | Normal | 1.1 | Abnormal |
| 68 | 93.66667 | Hypertensive | No | 14.86054 | Normal | 0.9 | Normal |
| 59 | 70.33333 | Normotens | Controlled | Yes | 20.54569 | Normal | 0.7 | Normal |
| 96 | 112 | Hypertensive | No | 31.23859 | Obese | 1.38 | Abnormal |
| 72 | 85.33333 | Normotensive | No | 17.30104 | Normal | 0.87 | Normal |
| 79 | 101 | Hypertensi | Uncontrolle | Yes | 19.72318 | Normal | 0.87 | Normal |
| 77 | 94 | Pre-hyperte | Controlled | Yes | 25.10388 | Overweight | 0.6 | Normal |
| 78 | 102.6667 | Hypertensive | No | 28.76397 | Obese | | | |
| 88 | 111 | Hypertensive | No | 33.64845 | Obese | | | |
| 58 | 84.33333 | Pre-hypertensive | No | 23.8054 | Overweight | 0.87 | Normal |
| 79 | 99.33333 | Pre-hypertensive | No | 27.55102 | Obese | 1.4 | Abnormal |
| 84 | 96.66667 | Pre-hypertensive | No | 14.81481 | Normal | 0.9 | Normal |
| 78 | 99 | Hypertensive | No | 28.125 | Obese | 1.6 | Abnormal |
| 82 | 99.33333 | Pre-hypertensive | No | 28.93519 | Obese | 1.4 | Abnormal |
| 69 | 94.33333 | Hypertensive | No | 26.43807 | Overweight | 1.2 | Abnormal |
| 71 | 85.33333 | Normotensive | No | 27.55556 | Obese | | |
| 81 | 106 | Hypertensive | No | 30.17882 | Obese | 1.5 | Abnormal |
| 92 | 108 | Hypertensive | No | 25.81663 | Overweight | | |
| 81 | 98.33333 | Pre-hypertensive | No | 21.08281 | Normal | 0.87 | Normal |
| 65 | 93 | Hypertensive | No | 22.86237 | Normal | 0.87 | Normal |
| 72 | 88.66667 | Pre-hypertensive | No | 29.72108 | Obese | 1 | Normal |
| 70 | 89 | Pre-hyperte | Controlled | Yes | 23.12467 | Overweight | 0.87 | Normal |
| 93 | 104.6667 | Hypertensi | Controlled | Yes | 30.78091 | Obese | 1.1 | Abnormal |
| 67 | 88.33333 | Pre-hyperte | Uncontrolle | Yes | 24.80159 | Overweight | 0.8 | Normal |
| 80 | 113.3333 | Hypertensi | Uncontrolle | Yes | 29.09428 | Obese | | |
| 55 | 83.66667 | Hypertensi | Uncontrolle | Yes | 37.46098 | Obese | | |
| 91 | 108.6667 | Hypertensi | Uncontrolle | Yes | 40 | Obese | 1.8 | Abnormal |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 65 | 85.33333 | Pre-hypert | Controlled | Yes | 20.47827 | Normal | 0.8 | Normal |
| 77 | 93.66667 | Pre-hypert | Controlled | Yes | 26.4 | Overweight | 0.9 | Normal |
| 89 | 109.6667 | Hypertensi | Uncontrolle | Yes | 41.11842 | Obese | 1.9 | Abnormal |
| 81 | 95 | Pre-hypert | Controlled | Yes | 31.21748 | Obese | 1.1 | Abnormal |
| 72 | 101.6667 | Hypertensi | Uncontrolle | Yes | 26.02264 | Overweight | 0.7 | Normal |
| 76 | 97.33333 | Pre-hypert | Uncontrolle | Yes | 29.17488 | Obese | 1.2 | Abnormal |
| 78 | 103.3333 | Hypertensi | Uncontrolle | Yes | 29.06574 | Obese | 0.9 | Normal |
| 66 | 91.33333 | Hypertensi | Uncontrolle | Yes | 25.10388 | Overweight | 0.7 | Normal |
| 78 | 114 | Hypertensi | Uncontrolle | Yes | 24.43519 | Overweight | 0.8 | Normal |
| 62 | 87.33333 | Pre-hypert | Uncontrolle | Yes | 27.45865 | Obese | | |
| 82 | 108 | Hypertensi | Uncontrolle | Yes | 26.00438 | Overweight | | |
| 93 | 110.6667 | Hypertensi | Uncontrolle | Yes | 25.72103 | Overweight | 0.8 | Normal |
| 71 | 88 | Pre-hypert | Controlled | Yes | 22.34778 | Normal | 0.8 | Normal |
| 89 | 119.3333 | Hypertensi | Uncontrolle | Yes | 33.91251 | Obese | 1 | Normal |
| 76 | 93.33333 | Pre-hypert | Controlled | Yes | 27.85201 | Obese | | |
| 66 | 93.33333 | Hypertensi | Uncontrolle | Yes | 24.44728 | Overweight | 0.8 | Normal |
| 70 | 87 | Pre-hypert | Controlled | Yes | 24.1 | Overweight | 0.9 | Normal |
| 91 | 104.3333 | Hypertensi | Uncontrolle | Yes | 22.49135 | Normal | 0.8 | Normal |
| 71 | 91.33333 | Pre-hypert | Uncontrolle | Yes | 22.75831 | Normal | 0.7 | Normal |
| 87 | 105 | Hypertensi | Uncontrolle | Yes | 25 | Overweight | 0.6 | Normal |
| 83 | 104.6667 | Hypertensi | Uncontrolle | Yes | 29.86496 | Obese | | |
| 76 | 93.33333 | Pre-hypert | Controlled | Yes | 30.45766 | Obese | | |
| 79 | 107 | Hypertensi | Uncontrolle | Yes | 23.58833 | Overweight | 0.7 | Normal |
| 78 | 95.66667 | Pre-hypert | Uncontrolle | Yes | 26.2 | Overweight | | |
| 96 | 112 | Hypertensi | Uncontrolle | Yes | 23.01118 | Overweight | 0.7 | Normal |
| 83 | 96 | Pre-hypert | Controlled | Yes | 22.0741 | Normal | 0.7 | Normal |
| 87 | 103.6667 | Pre-hypert | Uncontrolle | Yes | 32.04588 | Obese | 1.2 | Abnormal |
| 76 | 94.66667 | Pre-hypert | Uncontrolle | Yes | 22.14533 | Normal | 0.7 | Normal |
| 62 | 85 | Pre-hypert | Uncontrolle | Yes | 36.32813 | Obese | 0.9 | Normal |
| 57 | 76.66667 | Normotens | Controlled | Yes | 25.40282 | Overweight | 0.7 | Normal |
| 68 | 99.66667 | Hypertensi | Uncontrolle | Yes | 23 | Overweight | 0.7 | Normal |
| 70 | 87 | Pre-hypert | Controlled | Yes | 22.6 | Normal | 0.8 | Normal |
| 61 | 81 | Pre-hypert | Controlled | Yes | 33.64845 | Obese | 1.1 | Abnormal |
| 90 | 110 | Hypertensive | | No | 28.53746 | Obese | | |
| 68 | 88 | Pre-hypert | Controlled | Yes | 27.1 | Overweight | | |
| 73 | 90 | Pre-hypert | Controlled | Yes | 22.79033 | Normal | 0.8 | Normal |
| 91 | 104.6667 | Hypertensi | Uncontrolle | Yes | 25.78125 | Overweight | 0.8 | Normal |
| 90 | 107 | Hypertensi | Uncontrolle | Yes | 25.80645 | Overweight | 0.8 | Normal |
| 74 | 88 | Normotens | Controlled | Yes | 21.8 | Normal | 0.8 | Normal |
| 91 | 108.6667 | Hypertensi | Uncontrolle | Yes | 25.40282 | Overweight | 0.8 | Normal |
| 88 | 110.6667 | Hypertensive | | No | 26.29849 | Overweight | | |
| 91 | 110 | Hypertensive | | No | 23 | Overweight | 0.9 | Normal |
| 84 | 97.33333 | Pre-hypertensive | | No | 23.9 | Overweight | 0.8 | Normal |
| 92 | 107.3333 | Hypertensive | | No | 26.5 | Overweight | | |
| 90 | 106.6667 | Pre-hypert | Uncontrolle | Yes | 28 | Obese | | |
| 90 | 107.3333 | Hypertensi | Uncontrolle | Yes | 23.6 | Overweight | 0.8 | Normal |
| 78 | 94.66667 | Pre-hypert | Controlled | Yes | 22.6 | Normal | 0.8 | Normal |
| 88 | 109 | Hypertensi | Uncontrolle | Yes | 25 | Overweight | 0.8 | Normal |
| 90 | 100 | Pre-hypertensive | | No | 27.9 | Obese | | |
| 80 | 90 | Pre-hypert | Controlled | Yes | 22 | Normal | 0.6 | Normal |

| LDL | Dyslipidem | HbA1c (Bas | hba1c(2nd) | Perceived improvement in condition | Perceived health |
|---|---|---|---|---|---|
| | | 14 | 13.6 | Same | Healthy |
| 79 | Normal | 9.6 | 9 | Same | Healthy |
| | | 9.6 | 10.8 | Same | Healthy |
| 108 | Abnormal | 10.8 | 9.6 | Worse | Unhealthy |
| | | 11.4 | 10.3 | Worse | Healthy |
| 104 | Abnormal | 8 | 6.8 | Worse | Healthy |
| 94 | Normal | 9.6 | 8.2 | Worse | Uncertain |
| 70 | Normal | 8.1 | 7.5 | Worse | Unhealthy |
| 70 | Normal | 11.4 | 7.4 | Worse | Unhealthy |
| 70 | Normal | 10.6 | 9.8 | Worse | Unhealthy |
| 70 | Normal | 10.4 | na | Same | Healthy |
| 59 | Normal | 8.2 | 6.8 | Worse | Unhealthy |
| 129 | Abnormal | 6.9 | 7 | Worse | Uncertain |
| 111 | Abnormal | 11 | 9 | Worse | Unhealthy |
| 94 | Normal | 9.7 | 9.5 | Worse | Unhealthy |
| 66 | Normal | 8.2 | 7.2 | Better | Unhealthy |
| 94 | Normal | 9.6 | 8.8 | Worse | Unhealthy |
| 124 | Abnormal | 9.2 | 11 | Same | Healthy |
| 153 | Abnormal | 7.5 | 7.7 | Worse | Uncertain |
| 90 | Normal | 12.7 | 11.7 | Worse | Unhealthy |
| 91 | Normal | 11.8 | 11 | Same | Unhealthy |
| 120 | Abnormal | 10.7 | na | Worse | Uncertain |
| 89 | Normal | 8.8 | 8.6 | Worse | Unhealthy |
| 98 | Normal | 9.9 | 9.8 | Worse | Healthy |
| 104 | Abnormal | 8.3 | 8.8 | Worse | Healthy |
| 40 | Normal | 8.07 | na | Worse | Unhealthy |
| 80 | Normal | 5.8 | 6.9 | Same | Healthy |
| 90 | Normal | 8.3 | 9.9 | Same | Unhealthy |
| 94 | Normal | 9.9 | 10.2 | Worse | Unhealthy |
| 98 | Normal | 10.77 | 12.1 | Worse | Unhealthy |
| 84 | Normal | 7.53 | 9 | Worse | Healthy |
| 29 | Normal | 6.23 | 7.8 | Same | Healthy |
| 70 | Normal | 10.67 | 13.48 | Worse | Unhealthy |
| 110 | Abnormal | 6.23 | 7.8 | Same | Healthy |
| 90 | Normal | 7.3 | 5.4 | Same | Unhealthy |
| 91 | Normal | 5.9 | 7.1 | Same | Healthy |
| 88 | Normal | 7.7 | 7 | Worse | Unhealthy |
| 92 | Normal | 8.9 | 8.8 | Worse | Healthy |
| 66 | Normal | 7.8 | 9.8 | Same | Unhealthy |
| 88 | Normal | 8.6 | 8.9 | Same | Healthy |
| 110 | Abnormal | 8.83 | 8.3 | Worse | Uncertain |
| 98 | Normal | 9.5 | 11 | Same | Uncertain |
| 68 | Normal | 9.4 | 9.1 | Same | Healthy |
| 48 | Normal | 5.8 | 6.9 | Same | Unhealthy |
| 58 | Normal | 9.7 | 7.9 | Worse | Unhealthy |
| 59 | Normal | 10.9 | 9.9 | Worse | Unhealthy |
| 59 | Normal | 10.9 | 11.3 | Same | Unhealthy |
| 56 | Normal | 10 | 11.2 | Worse | Healthy |
| 98 | Normal | 10.3 | 10.7 | Same | Healthy |

| | | | | | |
|---|---|---|---|---|---|
| 75 | Normal | 10.3 | 7.9 | Same | Unhealthy |
| 88 | Normal | 10.5 | 7.3 | Worse | Unhealthy |
| 56 | Normal | 12.4 | 11 | Same | Unhealthy |
| 91 | Normal | 8.3 | 7.8 | Same | Unhealthy |
| 98 | Normal | 9.8 | 11 | Same | Unhealthy |
| 55 | Normal | 9.8 | 9.9 | Same | Unhealthy |
| 88 | Normal | 8.8 | 11.5 | Same | Unhealthy |
| 88 | Normal | 5.9 | 7.1 | Worse | Healthy |
| 94 | Normal | 9.8 | na | Same | Healthy |
| 88 | Normal | 8.8 | 8.5 | Same | Unhealthy |
| 110 | Abnormal | 11.4 | 11.53 | Same | Healthy |
| 88 | Normal | 8.8 | 11.5 | Worse | Healthy |
| 94 | Normal | 9.4 | 9.9 | Same | Unhealthy |
| 95 | Normal | 9.7 | 10.8 | Same | Healthy |
| 84 | Normal | 9.7 | 8.9 | Same | Unhealthy |
| 82 | Normal | 12.3 | 10.3 | Same | Unhealthy |
| 91 | Normal | 7.1 | 7.2 | Worse | Healthy |
| 152 | Abnormal | 7.8 | 6.8 | Worse | Unhealthy |
| 66 | Normal | 11.2 | 9.2 | Same | Unhealthy |
| 110 | Abnormal | 12.3 | 14 | Same | Unhealthy |
| 101 | Abnormal | 13.1 | 10.4 | Same | Unhealthy |
| 36 | Normal | 13.3 | 12 | Worse | Healthy |
| 70 | Normal | 7.6 | 6.3 | Better | Unhealthy |
| 70 | Normal | 7.53 | 9 | Worse | Healthy |
| 70 | Normal | 7.7 | 7 | Same | Unhealthy |
| 70 | Normal | 7 | 6.8 | Worse | Unhealthy |
| 121 | Abnormal | 8.8 | na | Worse | Uncertain |
| 70 | Normal | 7.1 | 8.8 | Worse | Unhealthy |
| 70 | Normal | 8 | 8.1 | Worse | Unhealthy |
| | | 6.9 | 9.4 | Same | Healthy |
| | | 6.9 | 9.4 | Worse | Unhealthy |
| 61 | Normal | 9 | 12 | Worse | Uncertain |
| | | 11.4 | 10.3 | Worse | Unhealthy |
| | | 8.4 | 9.8 | Same | Healthy |
| | | 11.8 | 11 | Worse | Unhealthy |
| 54 | Normal | 10.3 | 10.1 | Same | Uncertain |
| 90 | Normal | 7.5 | 7.7 | Same | Healthy |
| 90 | Normal | 6.9 | 7.9 | Worse | Unhealthy |
| 145 | Abnormal | 10.8 | 10.6 | Same | Unhealthy |
| 90 | Normal | 6.4 | 7 | Worse | Healthy |
| 91 | Normal | 7.3 | 7.2 | Worse | Healthy |
| 90 | Normal | 9 | 8.1 | Worse | Unhealthy |
| 90 | Normal | 12.7 | 11.7 | Same | Unhealthy |
| 90 | Normal | 10.7 | 7.1 | Worse | Unhealthy |
| 135 | Abnormal | 8.6 | 8.1 | Worse | Healthy |
| 90 | Normal | 9.7 | na | Same | Healthy |
| | | 7.3 | 5.4 | Same | Uncertain |
| | | 9.7 | 8.9 | Worse | Healthy |
| | | 9.7 | 7.9 | Worse | Unhealthy |
| 140 | Abnormal | 7.8 | 9.8 | Same | Unhealthy |

| | | | | | |
|---|---|---|---|---|---|
| | | 7.7 | | 8.1 Worse | Healthy |
| 120 | Abnormal | 9.4 | | 6.3 Worse | Healthy |
| 120 | Abnormal | 9.5 | | 10.9 Same | Unhealthy |
| 120 | Abnormal | 8.8 | | 9.6 Worse | Uncertain |
| 120 | Abnormal | 7.1 | | 6.6 Better | Unhealthy |
| 181 | Abnormal | 12.4 | | 11 Worse | Unhealthy |
| 120 | Abnormal | 6.4 | | 6.5 Worse | Uncertain |
| | | 9.2 | | 7.6 Worse | Unhealthy |
| 182 | Abnormal | 10.67 | | 13.48 Same | Healthy |
| | | 9.7 | | 7.6 Worse | Healthy |
| | | 10.1 | | 10 Same | Unhealthy |
| | | 8 | | 9 Same | Unhealthy |
| | | 7 | | 7.8 Worse | Unhealthy |
| 150 | Abnormal | 13.7 | | 8.2 Worse | Unhealthy |
| | | 7.6 | | 6.3 Worse | Healthy |
| | | 8.8 | na | Same | Healthy |
| | | 9.6 | | 7.4 Same | Healthy |
| 84 | Normal | 9.4 | | 8.3 Same | Healthy |
| | | 9 | | 8.9 Same | Healthy |
| 250 | Abnormal | 10 | | 10.5 Same | Unhealthy |
| | | 10.3 | | 9.1 Worse | Unhealthy |
| 132 | Abnormal | 6.3 | | 5.5 Worse | Healthy |
| | | 11.1 | | 8.3 Same | Unhealthy |
| 80 | Normal | 10.5 | | 7.3 Same | Unhealthy |
| 60 | Normal | 11 | | 8.5 Worse | Unhealthy |
| 60 | Normal | 7.9 | | 9.7 Same | Unhealthy |
| 60 | Normal | 7.8 | | 7.5 Worse | Healthy |
| 60 | Normal | 7.7 | | 8.1 Worse | Healthy |
| 104 | Abnormal | 7.9 | | 7.2 Worse | Healthy |
| 60 | Normal | 7.7 | | 6.3 Worse | Healthy |
| 60 | Normal | 5.8 | | 8.1 Worse | Unhealthy |
| 60 | Normal | 6.8 | | 9.1 Worse | Healthy |
| | | 10.8 | | 8.6 Worse | Healthy |
| | | 8.4 | | 8.6 Worse | Unhealthy |
| | | 10.4 | | 9.6 Worse | Unhealthy |
| 90 | Normal | 7.4 | | 7.5 Worse | Unhealthy |
| 90 | Normal | 9.1 | | 9.9 Same | Unhealthy |
| 90 | Normal | 8.4 | | 7.5 Worse | Unhealthy |
| 90 | Normal | 8.3 | | 9.1 Worse | Healthy |
| 90 | Normal | 9.4 | | 9.1 Worse | Healthy |
| 90 | Normal | 11.8 | | 13.2 Same | Unhealthy |
| 90 | Normal | 9.7 | | 10.6 Same | Unhealthy |
| 90 | Normal | 10.2 | | 7.8 Worse | Unhealthy |
| 90 | Normal | 12 | | 11.9 Same | Healthy |
| 90 | Normal | 10 | | 8.5 Worse | Unhealthy |
| 90 | Normal | 9.6 | | 10.2 Worse | Healthy |
| | | 9 | | 9.1 Worse | Unhealthy |
| | | 6.8 | na | Worse | Healthy |
| 110 | Abnormal | 13.2 | | 11.8 Same | Unhealthy |
| | | 6.8 | | 7 Worse | Healthy |

Satisfaction with insulin
Dissatisfied
Satisfied
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Uncertain
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Dissatisfied
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